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CONTENTS AND SUBJECT INDEX

Toxemia of Pregnancy: A Clinical and Pathologic Study. James R. Goodall, M.D., Montreal.....2121
Discussed by Drs. Janney and Kuder.

Bladder Abnormalities Due to Injury of Motor Pathways in the Nervous System. Lloyd G. Lewis, M.D.; Orthello R. Langworthy, M.D., and J. E. Dees, M.D., Baltimore..2126
Discussed by Drs. Duff, Muschat, Simons, Bisher and Lewis.

Artificial Fever Therapy of Syphilis. Walter M. Simpson, M.D., Dayton, Ohio 2132
Discussed by Drs. Menagh, Neymann, Lemoine, Engman, Stokes, O'Leary and Simpson.

Growth Arrest in Long Bones as a Result of Fractures That Include the Epiphysis. Edward L. Compere, M.D., Chicago.....2140
Discussed by Drs. Kidner, Bisgard and Compere.

Healing of the Newer Bumper Fractures of the Tibia. Walter G. Stern, M.D., and Louis E. Papurt, M.D., Cleveland.....2147
Discussed by Drs. Gallie, Magnuson, Conwell and Papurt.

CLINICAL NOTES, SUGGESTIONS AND NEW INSTRUMENTS

Reversed Colles Fracture: Successful Reduction by Closed Method. John G. Raymer, M.D., Norwich, Conn. 2150

Reverse Colles Fracture—A Plea for Closed Reduction. Ralph B. Bettman, M.D., and William J. Tannenbaum, M.D., Chicago.....2151

SPECIAL ARTICLE

Poliomyelitis Following Vaccination Against This Disease. J. P. Leake, M.D., Washington, D. C.....2152

COUNCIL ON PHYSICAL THERAPY

Radiotherapy (concluded). Arthur U. Desjardins, M.D., Rochester, Minn. 2153

COMMITTEE ON FOODS 2161

EDITORIALS

Collateral Circulation in Coronary Occlusion 2162

Gold Therapy in Arthritis.....2163

CURRENT COMMENT

The National Formulary VI....2164

Trend of Syphilis and Gonorrhea in the United States.....2164

(Subject Index on next page)

ASSOCIATION NEWS 2165

INDEX

List of Journals Indexed.....2195

Semiannual Index to Reading Matter in The Journal and to Current Medical Literature.....2197

Index to Authors.....2246

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SUBJECT INDEX TO THIS ISSUE

The letters used to explain in which department the matter indexed appears are as follows: The Star (*) indicates an Original Article; "ab," abstract; "E," Editorial; "C," Correspondence; "Ml," Medicolegal; "ME," Medical Economics.

A. M. A. Council on Medical Education and Hospitals, minutes 2165
A. M. A. Council on Medical Education..2165
Acetabulum, protrusion (Otto's disease) .ab-2194
Age determined by aorta roentgenography.ab-2192
Agranulocytosis, meningitic symptoms...ab-2189
Allergy, histamine treatment.....ab-2191
Appendicitis, acute, in aged.....ab-2193
Arteries, coronary, circulation.....E-2162
Arthritis, gonorrheal, prostate infected?....2179
gold therapy E-2163
Association News.....2165
Automobiles, accidents and road lighting....2169
Berlin Medical Society, 75th anniversary...2172
Birth Control controversy, England.....2169
Bladder abnormalities.....*2126
Blind, survey, California.....2165
Blood groups in twins.....2179
pressure, high, and cardiac reserve.....2177
pressure, high, electrocardiography....ab-2185
Board Examinations 2180
Bones, growth arrest in, after fractures...*2140
Book Notices 2180
Books Received.....Adv. Page 24
Brain, removal of hemisphere.....ab-2186
Bromides, vehicle for prescribing.....2178
Bureau of Investigation.....2176
Cancer, relation to leukemia.....2178
radiotherapy *2154
Cardiovascular Disease.....ab-2193
Colon, cancer, atypical onset.....ab-2190
Committee on Foods.....2161
Contracture, Volkmann's 2170
Corporations: dentistry; right to practice.Ml-2183
Council on Medical Education and Hospitals.2179
Council on Physical Therapy.....2153
Deaths 2174
Dermatology, International Congress.....2173
Diphtheria, no death from, Baltimore.....2166
Emetine, toxic effects.....2178
Estrogenic Substance applied to vagina..ab-2191
Ethiopia, Red Cross airplane for.....2170
Evans, Griffith, death.....2168
Fibromyoma uteri: radiotherapy.....*2154
Foreign Letters 2169
Glomus tumors 2178
Goiter, state survey, Michigan.....2166
Gonorrhea, trend in U. S.....E-2164
Heart disease, quinine salts in.....2171
electrocardiogram in rheumatic carditis.ab-2185
valve lesions in pulmonary tuberculosis.ab-2187
Hematemesis, azotemia after.....ab-2194
diagnostic significance ab-2187
Hemorrhage, sodium chloride injection..ab-2188
Hernia, diaphragmatic, or relaxation....ab-2191
Hospitals, additional, approved by A.M.A...2179
physicians as independent contractors. Ml-2184
psychiatric, discharging patients.....ab-2189
Will Rogers Tuberculosis.....2167
Hyperthyroidism, Abderhalden reaction..ab-2192
Industrial accident, reduction in, Germany..2172
Insurance, accident: sunstroke.....Ml-2184
Intestines hemorrhage, hyperazotemia in.ab-2194
Jaundice, acquired hemolytic.....ab-2191
Kraurosis vulvae ab-2188
Lead poisoning after taking lead oxide..ab-2194
poisoning relation to multiple sclerosis.ab-2185
Leg, chronic ulcers, treatment.....ab-2187
Liver function, Zinny azorubin test for.ab-2190
Lungs, cancer, pneumonectomy for.....ab-2186
Malpractice: anesthetics; death of patient.Ml-2182
operations; consent; by minor.....Ml-2182
sponge left in patient.....Ml-2183
Marriages 2174
Medical Examinations and Licensure.....2180
Medicolegal 2182
Meetings, Coming Meetings.....2164
Melena, azotemia after.....ab-2194
Meningitis, penitentiary quarantined.....2168
Milk allergy, treatment.....ab-2190
Monastral Fast Blue BS, discover new dye.2169
Mycetoma 2170
Mycotic infections of bones and joints.....2170
National Formulary VI.....E-2164
Neuron, constituents 2178
News 2165
Ophthalmia, sympathetic, in New York..ab-2186
Orthopedic, French Society.....2170
Paraldehyde, idiosyncrasy to.....ab-2189
Pathologists, Georgia Association of.....2166
Physical Medicine, International Congress..2169
Placentosis, a new disease.....*2124
Pleura effusion, new d'Amato sign for..ab-2190
Pneumonia in infants.....ab-2189
Poliomyelitis after vaccination.....*2152
Pregnancy, Bartholin gland abscess in.....2178
toxemia, clinical and pathological study.*2121
Queries and Minor Notes.....2177
Radio Broadcasts.....2165
Radiotherapy *2153
Radium operators, device for protection of..2169
Radius fracture, reversed Colles...*2150; *2151
Rheumatism, acute, skin reaction.....ab-2193
Richet, Charles, death.....2168
Scholarships, New York Post-Graduate...2167
Scleroderma, circumscribed.....ab-2188
with sclerodactylia, sympathectomy....ab-2190
Sinusitis, roentgen treatment.....2179
Skin disease 2173
Society Proceedings 2184
Sodium chloride, hypertonic wet dressing.ab-2188
chloride by hypodermoclysis.....2179
Spleen, ectopic, with torsion of pedicle....2171
hemolytic hypersplenia ab-2191
State Board Examinations.....2180
Sterile marriages, Germany.....2172
Stomach cardiospasm, cardiodysis for...ab-2193
hemorrhage (acute), hyperazotemia in.ab-2194
Syphilis, discovery 2172
effect on fracture healing.....2179
spirochetal vaccine cures.....ab-2192
treatment, artificial fever.....*2132
trend in U. S.....E-2164
Telegony 2179
Therapeutic Union, meeting.....2171
Tibia, newer bumper fractures.....*2147
Tonics and Sedatives.....Adv. Page 22
Tumors, radiosensitiveness.....*2154
Typhoid, control ab-2187
outbreak, Iowa 2166
Urine sugar, what limit may be disregarded.2179
Uterus fibroids and skull thickening.....2178
Vaginitis, amniotin for.....ab-2188
Viscerospasm 2171
Vision, routine tests; Snellen chart.....2178
Vulva, bleeding after incision.....2178
Water, stream pollution.....ab-2186
Weltmann's serum coagulation.....ab-2190
Whooping Cough, Sauer's vaccine.....2177

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TOXEMIA OF PREGNANCY

A CLINICAL AND PATHOLOGIC STUDY

JAMES ROBERT GOODALL, M.D., C.M. (McGILL), D.Sc. (McGILL)

Gynecologist and Obstetrician to the Royal Victoria Montreal Maternity; Clinical Professor of Gynecology and Obstetrics to McGill University Faculty of Medicine; Gynecologist and Obstetrician to the Jewish General Hospital

MONTREAL

Let it be stated that this work is far from completion: some parts are quite clear in my mind; others are still nebulous, and do not as yet fit perfectly into the scheme of things. For the last reason, it is thought that the whole truth has not been grasped. This applies not to the observed facts, which are irrefutable, but rather to the interpretation that has been put on these. This criticism applies more especially to the pathology of the placenta—a new, almost virgin, field. A good deal has been written about the physiology of the placenta, but of the pathology there is next to nothing. This study will cover a most intensive application to 1,000 placentas, described in detail immediately after birth, then labeled and hardened for six weeks. These are then cut into slabs of 1 cm. thickness, each slice is critically examined with a magnifying glass, and blocks for microscopic study are cut from these. The total will cover about three to five thousand slides. The clinical history is appended to each placental description, for study of relationship of pathologic changes and clinical signs. These 1,000 cases, of which 750 are completed—the other 250 are reserved for more intensive study—are consecutive hospital cases, normal and otherwise. The clinical study, on the other hand, comprises research on about 300 cases of toxemia of all grades of intensity. Lastly, an endeavor has been made to correlate clinical pathologic observations with placental disease. Here is the weak link, as yet quite incomplete, still nebulous, requiring careful circumspection and slow speed. Let me repeat, this is an incomplete report, subject to minor, perhaps some major, changes as new discoveries are made.

CLINICAL STUDIES

It is commonly taught that toxic cases in pregnancy fall into two great categories: (1) the preeclamptic and (2) the nephritic. Let me most emphatically state that this is wrong. There is but one toxemia of pregnancy, and all cases fall into that group. Only the preeclamptic are being dealt with, and these should be spoken of as cases of toxemia of pregnancy, and not as preeclamptic. All cases of toxemia are potentially eclamptic, but not all of them are preeclamptic.

Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

But what has led to this erroneous subdivision of cases into preeclamptic and nephritic is the hitherto unrecognized facts that, like all other diseases, toxemias are either (1) acute or (2) chronic, and these two groups differ so markedly in clinical picture and pathology that the connection has been overlooked. The chronic cases resemble the nephritic but are not nephritic, and when nephritis or kidney damage antedates a pregnancy, these cases ought to be spoken of as a nephritis complicated by a pregnancy, just as a heart or other diseased system may be complicated by a pregnancy. The clinical characters of acute cases will differ according to the organs that have to bear the brunt of the toxemic attack, whether it be liver, kidneys, nervous system or gastro-intestinal tract; and those organs will show the first and perhaps the most dominant symptoms, which possess a low reserve, or an idiosyncratic weakness for that specific poison. So that whether the clinical picture of the toxemia is the so-called renal or hepatic or neurotrophic or vascular extravasatory is not due to different primary or intermediate causes but to individual system instabilities arising out of a low reserve, combined with the intensity and the duration of the toxic attack.

In acute fulminating toxic states, the systems have not time to adjust themselves to the sudden development of the toxemia. As a consequence, the symptoms differ as markedly as do those of acute from chronic infections. The chronic toxemias, on the other hand, present a very protean symptomatology, and the reason why these cases rarely pass into eclampsia is that the time element allows for the development of cell accommodation and for increased tolerance on the part of the autonomic nervous system. The mass group of chronic cases can be classified more or less according to their symptomatology, and, what is much more important, much can be gathered that permits one to form some opinion of the danger to both mother and fetus:

1. A group of chronic cases in which the only sign of toxemia is a very large quantity of albumin in the urine, with or without casts. The albumin may be as high as 12 Gm. to the liter. It is not a matter of indifference whether casts are present or not. Into this further refinement I cannot enter here. But the total absence of symptoms and other signs is striking. These cases offer very good risks. Rarely do any serious damages to either mother or child develop. The placenta rarely shows any serious changes that might jeopardize the life of the fetus. The patients often wonder why so much concern is shown for them.

2. Cases similar to the former group but showing an elevated blood pressure. Here also there is a total absence of symptoms. In this group the prognosis of both mother and child depends more on the blood pressure than on the amount of albumin. In a percentage

of these, as in all toxic cases, the history of blood pressure before or in the early months of pregnancy may permit one to determine whether the pressure is due to the pregnancy or to some cause outside and antedating the pregnancy. It is only by watching cases from the early months, studying them in retrospect, that one can arrive at any differentiation. The prognosis varies with the blood pressure, and there is grave danger to both mother and fetus.

3. Cases without any symptoms whatever except a rising blood pressure and a progressive pallor. There may or may not be albumin and casts. In the majority of instances these are absent or intermittent. These are dangerous cases, with a doubtful prognosis for the mother and a bad prognosis for the child. The mother's future may be judged by the past observations and by the duration and intensity of the blood pressure. The life of the fetus is always a doubtful quantity, owing to the frequency of associated placental disease. The outcome for the fetus may be death in utero or intra partum, or the birth of an octogenarian.

All the foregoing have been symptom free.

4. Those with general or local edema and a normal blood pressure. These are relatively rare and are mostly found in twin pregnancies, and, as a rule, the prognosis for mother and child is good.

5. A group with edema, high blood pressure, albumin and casts, with nerve center symptoms such as headache, flashes in the field of vision, frosted glass visibility and intractable neuralgias. The prognosis for mother and child is poor if pregnancy is not soon terminated. The children often succumb. This is the common neutrotropic type, dangerous at the moment, and often leaving a train of nervous symptoms and ill health afterward.

6. A series with high blood pressure, gastro-intestinal disturbances, epigastric pain and possibly jaundice. Albumin may be large in quantity, with casts and a variable quantity of bile in the urine. The prognosis is bad, and unless the pregnancy is soon terminated, either spontaneously or artificially, the outcome will undoubtedly be serious.

These, of course, are more or less arbitrary lines of division, but they conform rather closely to types.

HEMATOLOGY

About 200 cases of toxemia have been examined by Dr. Rudolf Gottlieb and myself. In most of the cases of toxemia, even in the early stages before symptoms or clinical signs have developed, there can be demonstrated a definite shift to the right in leukocytes, such as one finds in many of the endocrine dyscrasias. The leukocyte count in pregnancy, normal and otherwise, is elevated to 10 to 12 thousand, owing chiefly to neutrophils, and in cases of advanced placental disease and necrosis this is shown in the blood by a definite microcytosis. But by far the most important change is found in pregnancy in the lowering of the hemoglobin coefficient. It has been found that the falling off of the hemoglobin content of the red blood cells (which by the way, do not show a corresponding reduction in number) begins rarely before the fifth month and is progressive from that time on. This is a true hypochromic anemia, and of the 300 cases that have shown this condition nearly every one has either a total, or nearly total, absence of gastric hydrochloric acid. This hypochromic anemia is particularly marked in cases in which the pregnancies have followed one another in rapid succession. In the young, and in those with few pregnancies, the hydrochloric acid begins to return post partum, before the patients leave the hospital. In the graver cases, with multiple pregnancies, the return is much retarded or may be incompletely restored or totally and permanently absent. The interesting sequence is this: that these cases respond rapidly to huge doses of iron, and as their blood equation is restored, many of the symptoms, such as numbness of the forearms after sleep, muscular cramps, headaches and neuralgias, disappear rapidly, almost magically. I think it also a fair inference that the incidence of toxemia will be greatly reduced by raising the quality of the blood, and consequently also of the cells and function, to normal or nearly to normal; for the tissues cannot be healthier than the blood, and normal blood and normal tissues presage normal function.

When, on the other hand, one comes to a consideration of blood chemistry in relation to toxemia, the situation is constructive. In all, several hundreds of all grades of chronic toxemia have been studied, and one is forced to the conclusion that blood chemistry is almost labor lost. The reports come back in the gravest chronic cases without any signs of retention, except in the gravest true chronic nephritic, not true toxic, cases. The urea, nonprotein nitrogen, carbon dioxide capacity, van den Bergh test and uric acid content usually vary within the normal limits, except perhaps the uric acid content, which frequently is high but seems to have little, if any, clinical significance. The statement that a concentration of uric acid over 6 per cent is indicative of an impending eclamptic seizure is certainly not in conformity with our large experience. There seems to be a relationship between a high uric acid content and low blood sugar estimation, but this again seems to have slight or no prognostic value.

In cases of true nephritis, blood chemistry may be of inestimable value; but chronic toxemia is not nephritis. Would there not be more rational signs if one were dealing with nephritis? In all my cases there was but one case with signs of nephritis in the ocular fundi. The fundi are singularly free in chronic toxemia. The most one sees are occasional small hemorrhages and, in serious cases, edema of the disk. I purposely requested that these cases be examined by one man, a senior ophthalmologist in McGill, in order that the individual equation might be eliminated. Homatropine was used in every case so that there could be no mistake.

Moreover, I have already published reports of five cases of chronic "nephritis" cured by pregnancy—cases of true nephritis, if one can trust the symptoms and signs of nephritis as interpreted by professors of medicine in McGill. The patients had been hospitalized for a time and every known test performed, and had been under observation from two to five years. They were advised against pregnancy, but they took their courage in their own hands and today, after one or two pregnancies, are free from high blood pressure, albumin and casts—in fact, normal healthy individuals. It prompts the important question what is nephritis? Several cases have been added to the list by my colleagues since my publication.

What, then, are the renal types of toxemia of pregnancy?

I am not prepared as yet to give an answer to that question. There are many more years of study ahead on the subject. But the vast majority of them are not nephritic when they appear so. Any deranged function, if sufficiently prolonged, will lead to progressive chronic organic changes, and that is the whole crux of this difficult problem. It is intensity and duration—but

chiefly duration—that lead to permanent organic disease. How long can deranged function persist without organic disease? The answer is that they are synchronous in operation, but functional dyscrasia may have to persist for quite a period and be of a certain intensity before the organic lesion becomes recognizable by our imperfect methods of examination. Hence the necessity of removing the cause as early as possible to reduce intensity and duration.

What is the cause of toxemia of pregnancy? I think it is an endocrine dysfunction. I published the study of the subject over a year ago. The reasons were as follows:

Pregnancy causes more change in the endocrine systems than in any other organs except the uterus. That is generally admitted today. The ovaries, thyroid, pituitary, pancreas, bone metabolism frequently all undergo marked alterations in pregnancy. In the majority of instances these changes usually retrogress when the pregnancy ceases. But occasionally pregnancy initiates a continuous train of endocrinologic sequences that are persistent, often permanent and progressive. That spells eventually progressive organic lesions. What glands are mostly at fault in toxemia? The major part of the blame would seem to lie with the posterior pituitary. The posterior pituitary has been shown to contain at least three ingredients which control uterine action, water balance, and blood pressure. Other glands of internal secretion have a profound effect on blood pressure also and may be incriminated with the posterior pituitary. Doubtless this is frequently the case, because endocrinologic dysfunctions are seldom uniglandular but mostly pluriglandular. In two cases of death following eclampsia I have been able to demonstrate unusually large pituitaries. These as yet have not been serially sectioned; but enlargement is not necessarily an accompaniment of increased function.

The whole danger, not in relation to life but in relation to organic disease, lies in the persistence of the dysfunction after the pregnancy has ceased, and this persistence is almost proportionate to the duration of the dysfunction in the pregnancy. Naturally intensity plays a large part also, but not to the same extent. These last two statements are so important and regular in their application that they might be put into the form of an axiom.

Toxemia considered from an endocrinologic etiology can be explained logically and that hypothesis as to its etiology gives us a rational instead of an empirical understanding of its treatment. By the endocrinologic hypothesis a ready explanation can be found for the cure by pregnancy of so-called nephritis, and for the incidence of organic lesions following chronic toxemia.

For an explanation of the cures of chronic nephritis one has to study a graph of another gland, the thyroid. Its secretion is complex, like that of the pituitary. Its symptomatology is consequently complex, and the organic lesions that follow its prolonged hyperactivity are not the direct result of the gland overactivity but of metabolic dysfunction which it entails. These organic lesions are proportionate with the duration of the gland dysfunction but also with its intensity. So it is with the posterior pituitary: the remote effect of the overstimulation of these glands by the pregnancy will depend in the last analysis on the reserve of the affected gland. So that the intensity and duration of the impulse, on the one hand, and the sensitivity and reserve of the glands on the other, determine the lightness or severity of the reaction, as well as its duration and after-effects.

It must be well understood that every function of the body is under control of some gland of internal secretion and that the pituitary seems to occupy the position of a master gland, like the master machine in large industrial plants, which controls the rate of operation of all minor machines.

The study of the metabolic changes that occur in the body as a consequence of acute or chronic toxemia may furnish data that have a bearing on gravity and outcome but can never lead to a discovery of the causation, any more than an estimate of glycemia or of the organic changes that follow on it can give an inkling of the causation of diabetes. The renal, hepatic, gastrointestinal, cardiovascular changes of toxemia are merely consequences, not causes, and a study of these will give a clearer picture of the effects but not of the underlying primary agent or agents.

PATHOLOGY OF THE PLACENTA

A good deal has been written on the physiology and permeability of the placenta, but its pathology is almost a closed book. It has been my great privilege to turn over just a few pages. Seven hundred and fifty placentas taken consecutively have been subjected to careful study. Some knowledge has emerged from this. May I repeat that the statements I am about to make are facts, not open to question; their interpretation is still decidedly questionable, requiring a great deal of atmospheric clearing before clear visibility is attained. One of the most striking facts is that placentas begin to degenerate at or about the seventh month, and that a normal healthy placenta at full term is a rarissima avis, so rare as to be almost nonexistent. The placenta at full term is a museum of pathology, in which the most startling and *sui generis* changes exist. Naturally these vary in degree in different placentas and at the various months of the third trimester. But, generally speaking, these degenerative changes are universal though varying in degree. This study has led to this understanding: that the placenta has a history like any other form of life. It has its embryony, its infancy, its adolescence, its maturity, and its senility. Interest lies chiefly in the end product. Generally speaking, decay begins about the seventh month and is progressive, though not necessarily so, and in this degeneration the placenta is not only frequently, but even liable—and more than liable, owing to its senility—to be overtaken by other disease processes, and it becomes one of my most difficult problems to separate senile changes from those of true organic pathologic changes. It will require years of intensive study to clear this field.

A question naturally rises to the mind: Why should placental degeneration occur when its full function has not been fulfilled? Let us go further. Why should degeneration occur when the fetal demands are still increasing? To the casual observer, this is an irrefutable statement. But it is a superficial view only of conditions. In early embryonic life the rate of life is greatly accelerated, and this rate gradually slows down throughout fetal life and throughout life in general, until the end of senility. Therefore, fetal demands, cellularly speaking, grow less and less as intra-uterine term progresses. True, the number of fetal cells to be fed grows, but their appetites are smaller. But a much more important fact lies in this, that in the early stages of fetal life the embryo depends on its mother for all its needs. Differentiation has not yet occurred, and function, except the most essential, cardiac, has not yet been established. Later, when cell differentiation is complete, not only can the fetus supply most of its own

needs, but it may elaborate in excess to supply a deficiency in the parent—a reverse current, as it were. So that at the end of fetal life the placenta is merely the transmitter of oxygen and partly assimilable food, and the clearing house of products of fetal metabolism—almost a dialysis. Lastly, in placental function nature follows her general rule in doing things abundantly. The placenta normally is an organ with at least 75 per cent reserve. This to me was an astonishing finding, that a child in utero could live on less than 25 per cent of its full placental capacity. But my surprise diminished when I thought of nature's care for the species, and it ceased completely when I learned from our physiologists that the young healthy child calls on only about 40 per cent of the functional capacity of its organs. If this is the case in postnatal life, how much more must this be true in fetal life, when body heat production, food search, food effort and food elaboration are reduced to a minimal denominator—in fact, when energy expenditure is reduced to the lowest possible degree. For let it be well understood that the mechanical destruction of food products is all in the column of expenditures, whereas the chemical destruction of higher products to the lower is all in the column of energy generators. With the former, the fetus has nothing to do; the mother does all that part of the mechanical expenditure for her offspring. It has only to do with the function of chemically breaking down higher standards to lower, from which it probably derives most of its energy. That implies fetal function. Are we to suppose that fetal function starts only in postnatal life? On the contrary, birth is just an incident, life is just a continuation in a new medium. Birth is just a transition—a transition from an aquatic to a terrestrial life, with internal changes to allow easy accommodation. So we see that the function of the placenta diminishes as fetal life advances, and that therefore degenerations of that organ are in keeping with its diminished activity. In a word, in the last months of pregnancy it has already fulfilled its greatest function.

As yet, I cannot separate senile changes from those of active organic disease. That is for the future. But it can be stated that that which is consistently found in all placentas, though perhaps varying in degrees, must be degenerative and not active disease. But here again a disturbing factor is found. As pointed out by my colleague Dr. John Fraser, it is not improbable that a senile placenta is much more vulnerable to abnormal circumstances than is a placenta in the full bloom of functional activity. This interesting suggestion is quite true—true not only in the placenta but also in all forms of living matter.

What are the chief pathologic placental changes?

Roughly, in order of their frequency, placental pathologic changes are as follows:

1. Chorionic sclerosis and subchorionic degeneration.
2. Placentosis.
3. Placental hemorrhages.
4. Infarctions (so called).
5. Placental degeneration cysts.

In the space at my disposal I can spend but a few words on each of these.

Chorionic Sclerosis and Subchorionic Degeneration.—A description of these changes—the fibrin deposits which spread from the fetal vessels like a lymph in response to maternal toxemia; the subsequent condensation of this; the sporadic deposit of lymph about a maternal node to constitute milk spots; the slow constriction of the deposits about the fetal blood vessels as they pierce the chorionic plate, the consequent subchorionic degenerations and diffuse blood extravasations—offers one of the most interesting chapters in human pathology.

Placentosis, a New Disease.—The second most common disease of the placenta may be acute or chronic, massive or spreading, and runs a course closely resembling pneumonia in its gross but not its microscopic appearance. I can give but a sketchy outline of this common disease, heretofore unrecognized. In the very acute form of massive placentosis, the placenta is almost black and almost diffluent. When cut anywhere in the fresh state, the placenta oozes a pool of very black blood; on section, cavities filled with blood abound. The fetal vessels stand out turgidly engorged The placenta also is turgid, giving it a firmer consistency than normal, the cotyledons swollen and rounded as if under tension. After hardening for from four to six weeks, the placenta cuts like liver tissue and is blue black on the cut surface; numerous hemorrhages are seen varying in size from millet seeds to large extravasations. The thickness of the placenta may be increased to 2 and even 3 inches. To this stage of the disease, owing to its resemblance to acute pneumonia and to liver tissue, I have given the name of "red hepatization of the placenta."

When massive and of great intensity, it will eventuate in a complete "infarction" of the placenta, and death of the fetus usually occurs between two and three days after the acute onset. This eventually, if not cast off immediately, gives place to a large white fattily degenerated placenta. If, on the other hand, the intensity is not so great or of long duration, recovery may take place. In this process the placenta presents the gross characteristics of a lung undergoing gray hepatization. The cotyledons become discrete, giving rise to an alveolar arrangement. The alveoli are separated by soft degenerated maternal decidual tissue, and the center of each alveolus usually shows a hemorrhage of various size. The whole placenta may be uniformly affected, but in many instances certain portions may be affected more intensely than other parts. Under these circumstances a fraction of the placenta may die, giving rise to a large infarction, whereas the rest of the organ may recover and eventually hypertrophy. The hypertrophy is always most marked in the parts most remote from the infarction. Absorption of the infarcts is always by a fatty degeneration, and cavitation, even to the size of walnuts, is common in the infarcted areas. These vomicae are usually filled with detritus. In the cases of chronic placentosis one has the same process at work, but it varies in intensity, and repair processes in one part of a placenta may synchronize with creeping destructive processes in another. The differences may be due to the life in the uterus of the attached placenta. This has been carefully studied in twin pregnancies and in cesarean sections. Placentosis is not a result of labor, because it is found to be as frequent in placentas obtained from selected cesarean sections.

Infarcts arise in other ways, but time will not permit me to enter into this subject. Hemorrhage is the third most common pathologic entity of the placenta. It is almost an invariable accompaniment of placentosis and occasionally appears without the disease. The vast majority of hemorrhages of the former type are centrally placed in the cotyledons, but many hemorrhages, of a toxic origin, also arise in the degenerated maternal tissues. The interesting fact is that placental hemor-

rhage is common, occurring in four out of five cases, and the still more interesting fact that of the 600 hemorrhagic cases in my series there were only eleven that presented symptoms that permitted a clinical diagnosis.

Placental degeneration cysts occur in about one case in three; when present, they are usually very numerous and vary in size from an almond to microscopic dimensions. They always occur in the maternal decidual tissues and are therefore always found between the cotyledons or in the subchorionic areas. They have no clinical significance except as an expression of the degree of degeneration of the maternal tissues. Their mode of formation consists primarily in a tremendous swelling of the decidual tissues by a hyaline deposit, and later a liquefaction spreading outward from the core. Their content is always a clear blue-green jelly, except when discolored by hemorrhage, which is not infrequent. The walls of the cysts are made up of decidual cells in various stages of hyaline degeneration. Most bizarre ghosts of these cells frequently ornament the jelly center.

CLINICAL SIGNIFICANCE

What is the clinical significance of all this? There is a very distinct connection between these placental diseases and clinical toxemia of pregnancy. What that connection is, I am unable at present to venture an opinion. Whether the placental disease is a sequel to toxemia or whether the toxemia is a result of placental disease is a problem of the first magnitude. Suffice it to state at this juncture that the relationship is intimate. But there is another interesting feature, and that is that there seems also to be an equally subtle connection between placentosis and the onset of labor.

If the theory is accepted that toxemia is the expression of a metabolic upset consequent on an endocrine dysfunction, the treatment of toxemia of the last few years becomes rational instead of empirical. It consists in blocking the nervous system until the primary exciting cause of the acute toxemia—namely, the pregnancy—can be removed. But it is the chronic cases that interest me most. Acute toxemias have almost been eradicated by close observation in the antepartum clinics. But chronic toxemias are as numerous as ever, and the attitude toward these cases in recent years has undergone a marked change. One is no longer justified in multiparas, with living children, in driving the mother to carry on to the end of her pregnancy. I have found that the longer the toxemia has lasted in the pregnancy, the greater is the tendency for the signs to persist when the pregnancy is over. And the converse is equally true. In primiparas, the risks should be clearly pointed out to the prospective mother, and she should have the last word in deciding her course.

The categories previously laid down, though far from being decisive, will often help in deciding on the issue. My experience, with early intervention, has taught that the incidence of chronic arteriosclerotic nephritis in later years is very markedly reduced, by shortening the duration of toxemic states. That so-called renal cases are not nephritic in the early stages of the disease is manifest. But that they are prone to become nephritic if the vitiated metabolism persists is parallel with similar conditions in thyroid and pancreatic and other endocrine dyscrasias.

Study of placental disease has taught me that a large percentage of children enter the first stage of labor handicapped by placental disease, and these may readily lose out in any prolongation or major effort in the second stage, at which time placental circulation is greatly impeded by the slowly diminishing placental site. The wonder also is that clinical placental hemorrhage is so common when placental hemorrhages are so very frequent. There is still much that requires elucidation.

1472 Sherbrooke Street West.

DISCUSSION

DR. J. C. JANNEY, Boston: The most notable advance in the study of toxemia is with regard to placental disorders. Dr. Goodall speaks of the frequency of anemia in pregnancy. Davis and Walker have reported similar observations. Although this report dealt with nontoxic patients, no one who is familiar with the importance allotted to anoxemia in the production of toxemia can fail to see that fighting the anemia and preserving the oxygen-carrying power of the blood is one of the important ways of preventing or minimizing local damage in organs with low functional reserve. As to the etiology of toxemia, I should like to accept the original suggestion of Hofbauer that the cause is hypersecretion of the posterior pituitary, and the work of Anselmino and Hoffman demonstrating the presence of pressor and antidiuretic substances in the blood of patients with severe grades of the disease. My associates and I have been trying to repeat the experiments but have reached no conclusion. The classification of toxemia as taught at present is unnecessarily complicated, but I cannot simplify it to one group. I should make preeclampsia and eclampsia a single group as Dr. Goodall does, and I agree with him that the different renal, hepatic, convulsive and gastro-intestinal manifestations are not due to differing primary or intermediate causes but rather to individual system instabilities in different patients. Pernicious vomiting and acute yellow atrophy of the liver may be shown to be manifestations of the toxemia of pregnancy. Low reserve kidney and chronic nephritis form what might be termed the decompensated kidney. It makes no difference from the point of view of the present pregnancy whether the kidney has been damaged by previous illness or is congenitally inferior. The essential feature is decompensation from overload. From the point of view of prognosis, however, the two may behave very differently. Long-term prognosis has received insufficient stress. The old idea that eclampsia conferred an immunity in subsequent pregnancies has been forced into the discard by the work of Peckham and others, who have shown that a very high proportion of such cases have been left with chronic nephritis. Heretofore it has been the accepted practice, except in the convulsive type of toxemia, to continue the pregnancy as long as it was safe. This subjected the liver, kidneys and other important organs to the greatest amount of damage consistent with life, whereas, if the patient had had a convulsive type of the disease and recovered, she might likely have had less permanent damage to these organs because the pregnancy was promptly terminated and the toxemia thereby halted.

DR. KATHERINE KUDER, New York: The lack at the present time of a uniform method of classifying the various types of toxemia of pregnancy is a drawback in any attempt to correlate the ultimate observations of different investigators. In the obstetric division of the Woman's Clinic of the New York Hospital the value of certain kidney function tests, especially the urea clearance test, is emphasized. Kidney function tests assist in the differential diagnosis between chronic nephritis and preeclampsia (eclampsia) and the group of toxemia in which the kidneys are not injured by pregnancy. In chronic nephritis the tests show decreased function. In a woman suffering from a definite and proved chronic nephritis, we advocate termination of the pregnancy and prevention of any further pregnancies. It is our practice to study carefully the blood chemistry of all patients suffering from a toxemia of pregnancy. The results show very slight variation from the normal in cases of chronic nephritis complicated by pregnancy except when the nephritis is so severe as to be accompanied by nitrogenous retention. However, in preeclampsia, the blood chemistry is of value as it shows a steadily increasing uric acid content and often a lowered carbon dioxide combining power. It is contrary to our teaching to classify toxemia on the occurrence of clinical manifestations, for totally different pathologic conditions may

be accompanied by the same symptoms. In their follow-up study of a large series of patients with chronic nephritis complicated by pregnancy, Stander and Peckham have shown that 40 per cent of these women died within ten years after the diagnosis was definitely established. This shows the grave prognosis of the condition and the importance of recognizing early in pregnancy an underlying nephritis so that the patient may be given the proper treatment. Dr. Stander regards nephritis complicated by pregnancy as a distinct and separate entity or disease process from eclampsia and preeclampsia. Blood studies, the subsequent history of the patient and the kidney function tests all support this contention. He has seen no patient in whom the diagnosis of nephritis complicated by pregnancy was established beyond doubt by chemical and laboratory observations, including repeated kidney function tests, who was cured of the nephritis during, after or by a pregnancy.

BLADDER ABNORMALITIES DUE TO INJURY OF MOTOR PATHWAYS IN THE NERVOUS SYSTEM

LLOYD G. LEWIS, M.D.
ORTHELLO R. LANGWORTHY, M.D.
AND
JOHN E. DEES, M.D.
BALTIMORE

It is important to recognize and catalogue the changes in micturition that may be produced by neurologic lesions. It is necessary to deal not only with trunks of sympathetic and parasympathetic fibers that supply the bladder but also with reflex arcs in the brain and cord extending as high as the cerebral cortex. Lesions may occur on the sensory or on the motor side of the reflex arc. The loss of sensory impulses may give rise to variable symptoms, depending on the level in the nervous system at which the fibers are interrupted and on the sensory pathways that are damaged. Tabes dorsalis furnishes a good example of an interruption of the sensory fibers in the posterior roots producing vesical symptoms. In this paper we discuss lesions of the motor pathways from the brain that influence the bladder. Of these long motor pathways two are known, one arising in the cerebral motor cortex and one in the midbrain.[1]

The present study is based on physiologic experiments reported some years ago by one of us.[2] Later we discussed at some length the neurophysiology of the bladder in connection with lesions of the spinal cord.[3] The reader is referred to these earlier reports for a consideration of fundamental theories concerning the function of the smooth muscle of the bladder wall in relation to its nerve supply.

METHODS

Under the heading of methods we consider the general principles of a successful apparatus. We feel that manometers utilizing water instead of mercury should be used for several reasons. The waves of contraction during filling will be found of great importance in reaching conclusions concerning detrusor activity. These waves are greatly damped or even lost by the inertia of mercury. An air-water system will at once record any rise or fall in intravesical pressure.

Another advantage of the water manometer is the inexpensiveness of the material required. With a few lengths of glass and rubber tubing it is possible to construct an apparatus that is adequate in every respect and that can be sterilized.

The instrument is shown in figure 1. A soft rubber catheter was inserted through the urethra into the bladder. This was connected by a T tube with a source of sterile fluid and with the manometer. We not only recorded the intravesical pressure during filling by measuring the height of fluid in the glass tube but also made records on a kymograph. We could not have reached certain conclusions concerning waves of vesical pressure unless these graphs had been available.

Respiratory waves may be differentiated easily from the slow waves of contraction of the bladder muscle. We noted any changes in pressure due to coughing, straining or movements on the part of the patient. The patient should lie flat on the back and remain as quiet as possible during the readings. Toward the end of filling, in certain cases in which it was of interest, the patient was asked to attempt micturition, and the subsequent rise of pressure was recorded. The type of graphic record that is obtained varies with the method of bladder filling. It is most satisfactory to introduce the fluid in equal portions (25 or 50 cc. at one time) and record the behavior of the bladder in the intervals. By this method it is possible to see the reaction of the muscle to sudden stretch and to measure the time required for the pressure to reach a resting level in accommodation to the new volume. The activity of the stretch reflex, which is of fundamental importance in the activity of the muscle, is tested in this way.

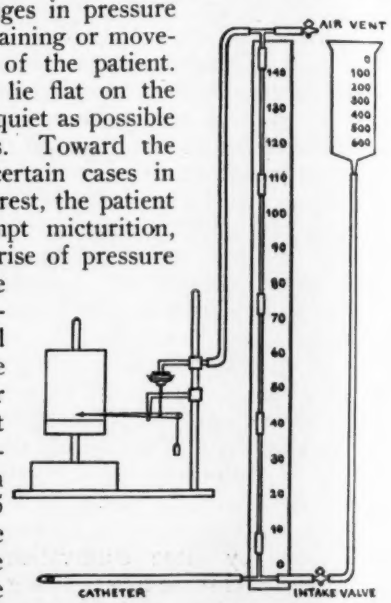

Fig. 1.—Apparatus.

In this paper only the activity of the detrusor muscle is considered, and the pressure at which the sphincters opened. It is clear that the detrusor muscle normally is adapted for the storing of urine and that its contraction initiates micturition.

There is a certain distortion of the graphic record, owing to the stretch coefficient of the rubber diaphragm in the tambour. The rubber stretches markedly with slight increase in pressure, but the stretch is proportionately less marked as the pressure rises. Therefore slight changes when the pressure is low are magnified out of proportion to the changes at higher pressures.

CYSTOMETRIC READING MADE FROM A PATIENT WITH NORMAL BLADDER INNERVATION

The cystometric reading that is discussed as normal was made on a patient with an obstructive lesion at the vesical orifice and with a slightly contracted bladder.

This study of the control of the bladder by the central nervous system was supported by a grant from the National Research Council.
Read before the Section on Urology at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.
From the Medical Service of the Baltimore City Hospital, the subdepartment of neurology and the James Buchanan Brady Urological Institute, the Johns Hopkins University and Hospital.

1. Langworthy, O. R., and Kolb, L. C.: Demonstration of Encephalic Control of Micturition by Electrical Stimulation, Bull. Johns Hopkins Hosp. **56**: 37 (Jan.) 1935.
2. Langworthy, O. R., and Kolb, L. C.: The Encephalic Control of Tone in the Musculature of the Urinary Bladder, Brain **56**: 371 (Dec.) 1933.
3. Langworthy, O. R., and Lewis, L. G.: Urgency and Frequency of Micturition in Neurological Disease, Bull. Johns Hopkins Hosp. **56**: 211 (April) 1935.

The graph is shown in figure 2. An ideal adjustment of the catheter was made while the bladder was empty, so that respiratory waves were recorded. The pressure in the empty bladder was between 1 and 2 cm. of water. Fluid was introduced in equal amounts of 50 cc. until filling was complete. The intravesical pressure fell quickly to a resting level. Following the introduction of the first quantity of fluid the pressure was from 3 to 4 cm. and was 8 cm. only after 250 cc. had been injected. When the bladder contained 150 cc. and again at 200 cc. there were irregularities in the graph resulting from movement on the part of the patient; with 200 cc. in the bladder there was the first feeling of distention. As filling progressed the bladder accommodated an increased volume less quickly. After 300 cc. had entered the bladder the pressure fell slowly. There were a number of small waves of contraction, the pressure rose rapidly to 70 cm., and fluid escaped around the catheter. We felt that this was a normal record except that the total volume was somewhat below the average. A series of readings on normal individuals with bladder capacity of from 500 to 550 cc. has been made.

TYPES OF LESIONS OF THE NERVOUS SYSTEM

In figure 3 we have endeavored to give a suggestion of the position of the lesions discussed in this paper. The bladder is bilaterally represented in the cerebral motor cortex. Patients were chosen with bilateral cerebral accidents that injured the motor pathways on both sides; the lesion would correspond to an injury at a level marked 1. Also patients with unilateral lesions were studied; the injury would correspond to the section of one pathway at 2. The changes in the extremities of the latter patients were manifested as a hemiplegia. The other motor pathway arises from cells in the region of the midbrain; they apparently have to do with the control of tone in the smooth muscle of the bladder wall. The manner in which the tracts from these two regions make connections in the

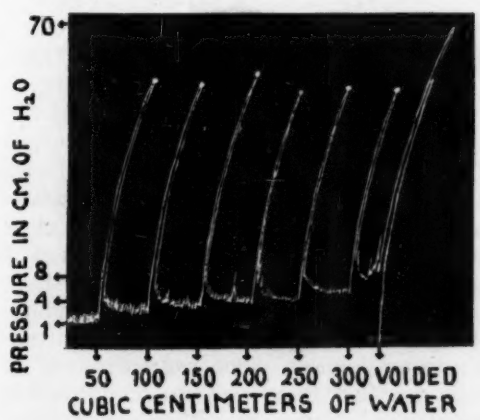

Fig. 2.—Normal cystometric reading.

cord to influence the preganglionic autonomic cells is little understood. The final group of abnormalities that we shall discuss have to do with lesions of the motor tracts in the spinal cord. Here the two motor tracts lie close together in the lateral columns of the cord.

BILATERAL LESIONS OF THE CEREBRAL MOTOR CORTEX OR OF THE INTERNAL CAPSULE

After bilateral lesions of the cerebral motor cortex or of the internal capsule, injuring the fibers running from the cortex to the spinal cord, characteristic changes of the functioning of the bladder occur. The possible position of the lesion is indicated as 1 in figure 3. Under these conditions the bladder empties frequently and precipitously when small amounts of urine collect.

Usually the patient has little voluntary control and is constantly incontinent. If the sensory fibers to the cortex are uninjured, the patient may be aware of the imminence of micturition.

CASE 1.—A white man, aged 64, was diagnosed as having syphilis, bilateral hemiplegia, pseudobulbar palsy and bladder and bowel incontinence of five months' duration.

The record of the cystometric reading is shown in figure 4. The resting pressure in the bladder was 2 cm. of water. After 25 cc. of fluid had been introduced the pressure gradually fell to a resting level of 6.5 cm. Respiratory waves were recorded. Then the volume of the bladder was increased to a total of 50 cc. A cough occurred, which caused a sudden change of pressure. There was delayed accommodation. Then a wave of contraction occurred, followed by a fall of pressure and a sudden, precipitous rise to 96 cm. The bladder emptied completely around the catheter.

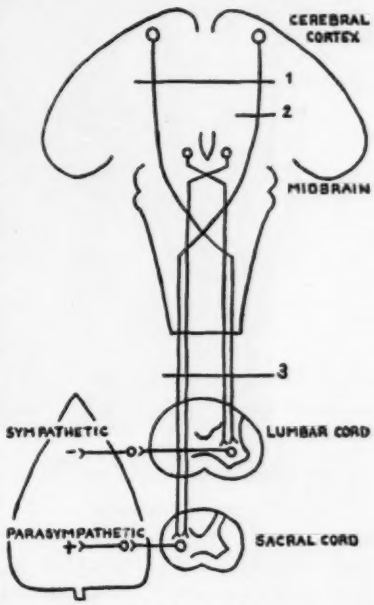

Fig. 3.—Position of lesions.

The average normal capacity of the human bladder is about 500 cc. In this patient the bladder contracted forcibly and emptied with a volume of 50 cc.

CASE 2.—A white man, aged 51, was admitted to the hospital in 1935. The diagnosis was bilateral hemiplegia, pseudobulbar palsy, and bladder and bowel incontinence.

Figure 5 shows the behavior of the bladder as twelve equal amounts of fluid of 25 cc. were introduced; a total amount of 300 cc. of fluid was used. The rises in pressure due to the addition of fluid are marked with white dots in order to increase the ease of reading the graph. Immediately after 75, 125, 175, 225 and 300 cc. were introduced, a contraction of the bladder musculature occurred. Some fluid escaped around the catheter at each rise of pressure, although the bladder did not empty completely. These contractions were of greatest force early in the process of filling, and they decreased in amplitude as a greater volume was attained.

The rises show that the muscle was hyperirritable to stretch stimuli. Contractions occurred only as every other 25 cc. of fluid was added.

UNILATERAL LESIONS OF THE CEREBRAL MOTOR CORTEX OR OF THE INTERNAL CAPSULE

In the basic work dealing with acute experiments with animals it was found that removal of one cerebral motor cortex caused a marked decrease in bladder volume.[2] Removal of both cerebral cortices produced a further decrease in bladder volume; the bladder then behaved after the manner described in the preceding section. Later the cerebral motor cortices were stimulated and the behavior of the bladder was noted.[1] This stimulation produced a fall in intravesical pressure followed by a sharp rise initiating micturition, if stimu-

lation was continued. We found that responses could be obtained more easily from one cortex than the other, and that usually the left was the more responsive. It was suggested that one cortex was dominant in bladder control.

We have studied the behavior of the bladder in seventeen persons with unilateral lesions of the cerebral motor cortex or internal capsule, with the typical changes in the extremities characteristic of hemiplegia. Many of these patients did not complain of subjective bladder disturbance. In all cases the graph showed signs of abnormality. Six of these suffered from a left and eleven from a right hemiplegia. All six patients with a left hemiplegia had a bladder of approximately average volume.

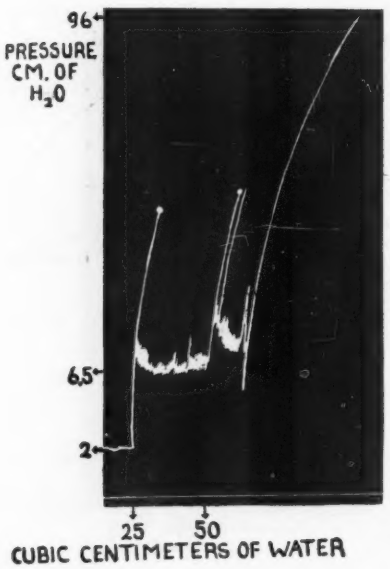

Fig. 4.—Cystometric reading in case 1.

Ten of the eleven patients who suffered from a right hemiplegia had a bladder of less than the normal capacity.

These observations suggest that one hemisphere is dominant in bladder control, and that this dominance is on the left side in right handed persons.

CASE 3.—A Negro, aged 50, in August 1929 developed typical left hemiplegia with characteristic posture of the arm and leg.

A graphic record of the bladder function is shown in figure 6. Six equal quantities of fluid of 50 cc. were introduced into the bladder, which emptied on 300 cc. of fluid. The initial pressure in the empty bladder was 6 cm. of water, and the pressure remained below the level of 14 cm. of water until the bladder held 300 cc. Even with the viscus empty, and during the entire process of filling, small rhythmic contraction waves occurred. These have never been observed in the normal person. After the introduction of a quantity of fluid the pressure was slow in reaching a resting level; this became more marked as filling progressed. The rise of pressure at the end was definitely related to the introduction of fluid. Waves developed, which rapidly fused into a tonic contraction, emptying the bladder. This is a typical illustration of the type of graph obtained from patients with a left hemiplegia. The total volume, however, was comparatively small.

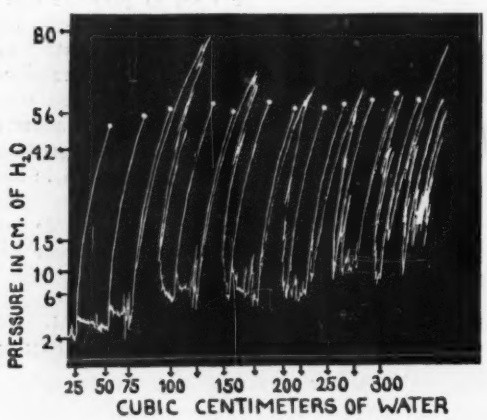

Fig. 5.—Behavior of bladder in case 2.

CASE 4.—A Negro, aged 42, suddenly developed right hemiplegia with aphasia in October 1927.

The record of vesical function in this patient is shown in figure 7. Fluid was added in four equal quantities of 50 cc. Even with the bladder empty, contraction waves were present. They occurred throughout the course of filling, and the fall to a resting pressure was delayed after fluid was introduced. The pressure rose rapidly on 200 cc. of fluid, and the bladder emptied.

CASE 5.—A Negro, aged 43, lost the use of his right arm and leg in June 1934. A marked aphasia developed at the same time.

Study of the bladder revealed marked motor abnormalities, which are shown in figure 8. These have to do particularly with increased response to stretch stimuli. The pressure in the empty bladder was from 3 to 4 cm. of water; respiratory waves were recorded. After the first 50 cc. was introduced, the pressure fell slowly to a resting level of 6 cm. and there were small, irregular waves of contraction. Immediately following the introduction of each of the next three 50 cc. of water, the pressure rose to 76 cm. and sustained this level for some time. Irregularities of pressure were seen throughout the graph. Some urine was expelled with the strong contractions, but the bladder did not empty completely. When the bladder contained 200 cc. it contracted strongly not only once but a second time, and the experiment was terminated.

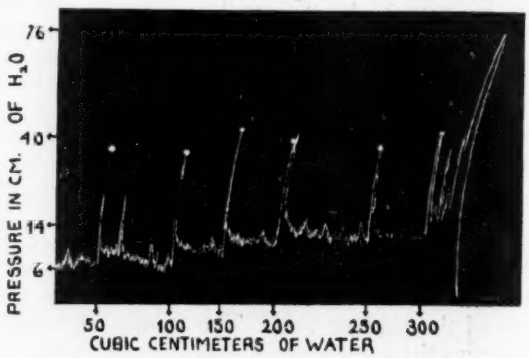

Fig. 6.—Function of bladder in case 3.

BEHAVIOR OF THE BLADDER AFTER INJURY OF THE MOTOR PATHWAYS IN THE SPINAL CORD

No cases of bilateral injury of the pathways arising in the midbrain that influence the activity of the bladder musculature have yet been recognized in isolated form. The pathway from the midbrain must lie close to the corticospinal pathway in the lateral columns of the cord, and the two may be injured together. We shall present examples of spinal cord injury which produce abnormalities corresponding to those described in the preceding section. Later other examples will be given in which we feel that both the corticospinal tracts and the pathways from the midbrain had been injured bilaterally.

CASE 6.—A Negro, aged 43, developed paraplegia in extension three years ago. This is a case of disseminated sclerosis. He never complained of any urinary symptoms. He stated that he micturated two or three times a day and twice at night.

Examination of the bladder function showed marked hyperactivity of the stretch reflex, as shown in figure 9. Fluid was introduced into the bladder in four equal quantities of 50 cc. The graph of the empty bladder recorded small waves of contraction. After each quantity of fluid was introduced, the pressure rose rapidly to over 65 cm. of water, and almost complete evacuation occurred with each rise. This is an excellent example of abnormality due to bilateral involvement of the corticospinal fibers to the bladder.

Another example of similar nature is given in which the bladder did not respond to each addition of fluid, and contractions due to more complicated causes were observed:

CASE 7.—A white woman, aged 39, suffered from disseminated sclerosis. In 1924 her legs became weak, and a year later she noticed decreased visual acuity. In 1925 she first developed frequency and urgency of micturition, and this has been one of the most unpleasant symptoms of the disease, as she had to empty the bladder almost hourly during the day and night. Report of the neurologic examination will be omitted except for the difficulties in the legs. The patient walked unsteadily on a broad base. There was outspoken ataxia of both legs. The deep reflexes were hyperactive in the legs, and there was a bilateral Babinski reflex. The blood and spinal fluid Wassermann reaction was negative.

The bladder record is shown in figure 10. Small contraction waves were seen with the bladder empty, and throughout filling. The pressure with the viscus empty was 5 cm. of water. The pressure fell to a level of 6 cm. after the first 25 cc. of fluid had entered the bladder. Then a sharp rise occurred to a pressure of 68 cm. without the escape of fluid. We believe that this rise was dependent on psychic stimulation. The door was suddenly opened and some one spoke in a loud voice. We have shown in another place that the corticospinal responses are sometimes not entirely lost in patients with the bladder symptoms characteristic of disseminated sclerosis, and that the intravesical pressure may be either raised or lowered by psychic stimuli.[3] The pressure remained low after the next two quantities of 25 cc. were introduced, but when the volume was made 100 cc. it rose to 70 cm. and the patient voided 75 cc., leaving a residual amount of 25 cc. The pressure fell to a resting level. Then no rise in pressure occurred until 75 cc. had entered the bladder, making a total of 100 cc. Again the pressure rose to the former high level and 75 cc. was voided. It may be assumed in this case that the stretch reflex became active on a volume of 100 cc.

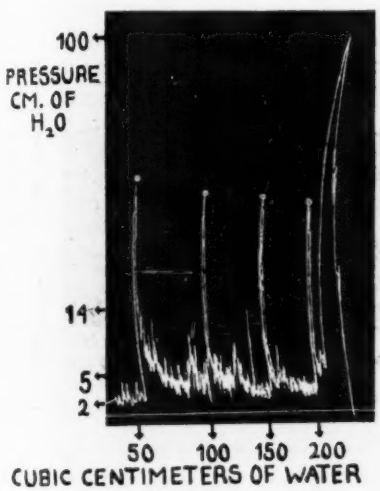

Fig. 7.—Vesical function in case 4.

In the next two patients there was a different type of contraction wave with filling:

CASE 8.—A Negro, aged 39, developed spastic paraplegia in 1925 due to syphilis. The patient complained of incontinence. This consisted of extreme urgency so that it was impossible to hold any quantity of urine, and dribbling occurred.

The bladder study is graphically represented in figure 11. Rhythmic waves were present even with the bladder empty. The introduction of 50 cc. of fluid was followed immediately by two large waves. The pressure then fell to a high resting level, and small contractions occurred at intervals. The patient was conscious of fulness during the large waves but was comfortable after they subsided. Increasing the volume of the bladder to 100 cc. is recorded on the graph by the second white dot. Then repeated large contraction waves occurred and the pressure never fell to a resting level. By engaging the patient in conversation we postponed the onset of the seventh wave. There was discomfort when the pressure was high. The waves continued with 150 cc. in the bladder, with moderate to severe discomfort. Some fluid escaped at the peak of the waves. With 200 cc. of fluid in the bladder the patient experienced severe pain. He could not voluntarily raise the pressure to a high level. The experiment was terminated at this point.

This record differs from the others in that the bladder was not only hyperirritable to stretch but rhythmic waves of contraction occurred continuously. These waves were relatively inefficient in discharging urine. There was little sensory involvement in the legs. We believe that in this case both of the motor pathways from the brain were interrupted bilaterally.

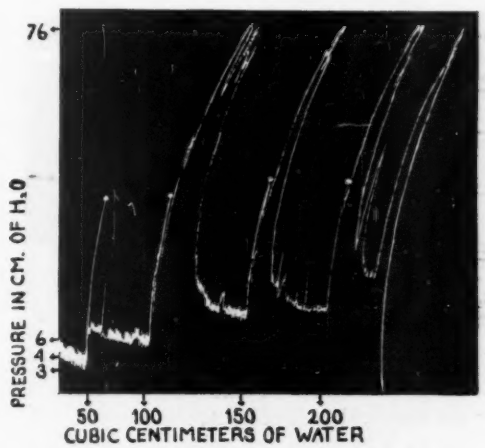

Fig. 8.—Motor abnormalities shown in case 5.

CASE 9.—A white man, aged 54, first noticed some weakness of both legs in 1932. Two years earlier he had developed frequency of micturition. In 1932 he suddenly became unable to void and since that time has used a catheter daily. There was slight spasticity of the legs. His gait was both spastic and ataxic, and the Romberg test was positive. Pain responses were poor in the ankles. The vibratory sense and sense of passive movement were unimpaired. There was a bilateral Babinski reflex and bilateral ankle clonus. The Wassermann test was negative in the blood and spinal fluid.

Figure 12 shows the filling record in this case. The pressure remained low until the volume was 150 cc. Then contraction waves appeared not only related to the introduction of fluid but also occurring rhythmically. They became more marked after the capacity reached 250 cc. The patient was very uncomfortable with 400 cc. in the bladder, and the waves were of great height. He was then asked to attempt to micturate and raised the pressure to 115 cm.; fluid escaped from the bladder. The frequent waves during filling with no sustained rises of pressure suggest an injury of both motor pathways from the brain.

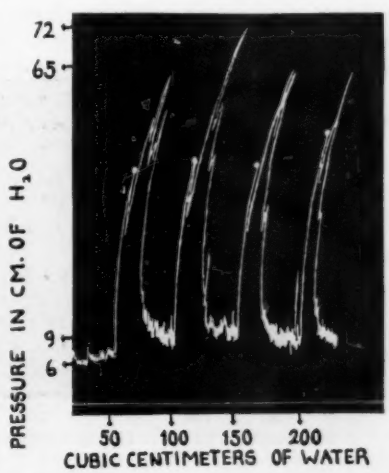

Fig. 9.—Marked hyperactivity of stretch reflex shown in case 6.

COMMENT

The graphic method of recording vesical activity through an air-water system gives a clear picture of contraction waves during filling. These waves are not present in normal individuals, and their study is of importance in estimating the degree of loss of function. Normal micturition depends on a steady rise of bladder pressure of sufficient strength and duration to empty the viscus completely. When waves occur rhythmically and frequently, they do not have the strength or duration for efficient emptying. There may be some escape

of fluid at the height of the waves. As the neurologic control of the bladder is progressively lost, the waves become more frequent but their force and duration become smaller.

The cases reported are typical examples of a large group of patients who were studied. The first group recorded bladder activity after removal of all motor

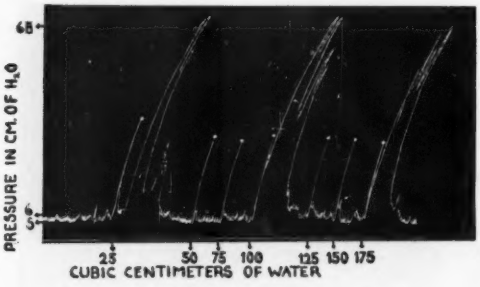

Fig. 10.—Bladder record in case 7.

stimuli from the cerebral cortices. Just as in striated muscle, so in the case of the smooth muscle of the bladder the cerebral cortex controls activity. It enables the bladder to hold large amounts of fluid at a relatively low pressure below the level of discomfort. After the removal of this influence the bladder capacity becomes smaller, and there is frequency of micturition.

The effect of loss of this cortical control can best be expressed in another way as a hyperirritability of the stretch reflex. Again an analogy with striated muscle can be used. The tone and to a certain extent the contraction of striated muscle is dependent on afferent stimuli, arising in the muscle itself. This is exemplified by the knee jerk. The sudden stretch applied to the tendon of the quadratus femoris stimulates the sensory endings in the muscle and produces a reflex contraction. These stretch reflexes are normally controlled by the cerebral motor cortex, and the deep reflexes become hyperactive after injury of the corticospinal fibers.

Denny-Brown and Robertson [4] showed clearly that the smooth muscle of the bladder also responded to the stretch, and its activity was built up primarily on the basis of the stretch reflex. It is only necessary to

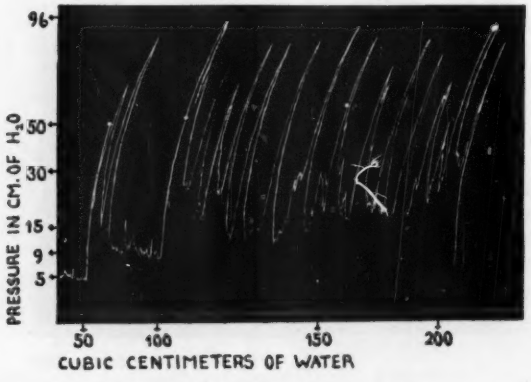

Fig. 11.—Bladder study in case 8.

examine the graphs in this paper to realize that the stretch reflex in the smooth muscle of the bladder is hyperactive after loss of cortical stimuli. Immediately after the introduction of fluid a strong contraction of the muscle occurs, which is dependent on the sudden stretch produced by the fluid. This rise does not occur in a normal person, at least till the end of filling.

After injury of the corticospinal fibers, even on one side, similar increase in the stretch reflex is often seen. This is particularly true with lesions of the left side of the brain producing a right hemiplegia. It may be concluded that one hemisphere is normally dominant in the control of vesical activity.

The rapid and forceful rise of pressure dependent on the hyperactivity of the stretch reflex demands an immediate emptying of the bladder and gives rise to the complaint of urgency. As the normal cortical control is no longer present, these patients are unable to overcome the waves of contraction and cannot postpone micturition by a conscious effort. If the force of the waves is less marked, the urgency is less severe.

The frequency of micturition with the expulsion of a small volume of urine is dependent to a great extent on this hyperactivity of the stretch reflex. It is largely a physiologic abnormality and is not dependent on fundamental anatomic changes making the bladder small. This is evident from the fact that the patients often notice frequency only on some days, while on other days the bladder will hold a normal quantity. Excitement may at times give rise to frequency in the normal person.

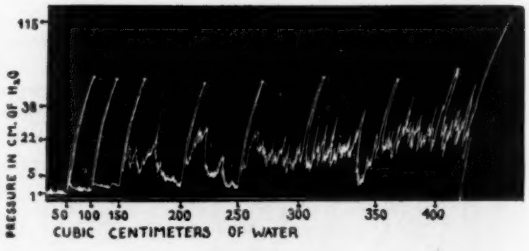

Fig. 12.—Filling record in case 9.

There is, however, another factor that undoubtedly contributes to the small quantity of urine which these abnormal bladders hold. After section of the corticospinal fibers there is increased tone of the striated muscle. This again is dependent on the hyperactivity of the stretch reflex. The increase in tone is more difficult to demonstrate in the case of the bladder. If the pressure falls to a resting level, it seems little higher than the resting level in a normal bladder. In some cases, however, the pressure during filling was high even at a resting level. It is probable that the small volume is dependent on the increased tone of the smooth muscle of the bladder wall decreasing the lumen of the viscus.

In all these patients with bilateral or even unilateral lesions of the corticospinal tracts the external sphincter showed increased tone. Denny-Brown and Robertson [4] have suggested that this is dependent on an increased tone of the striated muscle entering into the composition of the external sphincter. This is not an all inclusive explanation, as the external sphincter has marked tone in patients with tabes. In these patients the striated muscle shows loss of tone.

When the interior of the hyperirritable bladder is examined with a cystoscope, coarse trabeculations of the detrusor are seen and the trigon shows hypertrophy. Whether this is due to actual increase in muscle volume or to thickening of the wall dependent on its small size it is difficult to say.

4. Denny-Brown, D. E., and Robertson, E. G.: On the Physiology of Micturition, Brain **56**: 149 (July) 1933; The State of the Bladder and Its Sphincters in Complete Transverse Lesions of the Spinal Cord and Cauda Equina, ibid. **56**: 397 (Dec.) 1933.

It is thought that the pathway from the midbrain influencing the bladder has to do with the control of tone in the wall. This mechanism is released from cortical influence and permitted to overact after bilateral injury of the corticospinal path. We have not recognized a case in which this mechanism was injured bilaterally without involvement of the corticospinal fibers. Theoretically this would produce an enlargement of the bladder with difficulty in emptying.

If these midbrain pathways are injured in the cord together with the adjacent corticospinal fibers, one would expect that bladder function would be less efficient. The waves of contraction, while occurring more often, are not of sufficient strength or duration to permit efficient emptying of the bladder. Fluid escapes from the urethra at the height of the waves, and the patient has little if any voluntary control, because of interruption of the corticospinal fibers. We have presented graphic records from two cases that fall into this group.

Rose [5] has done a great service in popularizing cystometry among urologists. Recent workers [6] have spoken of hypotonic and hypertonic bladders. This is perhaps a convenient classification, but it does not explain all possibilities of bladder abnormality. A hypotonic bladder may be one produced by injury of the posterior spinal roots in tabes dorsalis. Here, owing to overdistention and loss of tone, the bladder is able to accommodate large amounts of fluid at a relatively low pressure. We have been able to produce this condition experimentally and follow its evolution.[7] The bladder would also be hypotonic immediately after a severe injury to the spinal cord, as the result of the so-called shock resulting from sudden interruption of pathways in the cord. Later with the development of reflex micturition it would be considered hypertonic. It has been shown that the bladder of small capacity after bilateral pyramidal tract injury is probably a hypertonic bladder in the true sense of the word. Here the resting pressure in the bladder is usually greater than normal. Of more importance than the resting pressure is the powerful, sudden contraction of the bladder that follows stretching of the muscle.

SUMMARY

By means of an air-water manometer and recording tambour we have made graphic records of the behavior of the detrusor muscle during bladder filling. The bladder muscle characteristically responds to stretch stimuli, and important information can be obtained by observing and recording waves of bladder contraction. Patients were studied who suffered either bilateral or unilateral pyramidal tract injuries or had lesions of motor tracts in the spinal cord. With release from cortical control, the stretch reflex is hyperactive. The bladder empties precipitously with a small volume of fluid. When the motor pathways from the midbrain are injured bilaterally along with the corticospinal tracts, the waves of bladder contraction are frequent but of small amplitude. They are ineffective in emptying the bladder. A study of contraction waves of the muscle during filling is of aid in forming an opinion of the efficiency of a bladder with damaged innervation.

Medical Arts Building.

5. Rose, D. K.: Various Cystometrograms and Their Interpretation, J. Urol. **27**: 207 (Feb.) 1932.
6. Muschat, Maurice: The Value of Cystometry, J. Urol. **33**: 366 (April) 1935.
7. Dees, J. E., and Langworthy, O. R.: Experimental Study of Bladder Disturbances to Those of Tabes Dorsalis, J. Urol. **34**: 359 (Oct.) 1935.

ABSTRACT OF DISCUSSION

DR. JOHN DUFF, New York: I congratulate the authors on their skilful use of cystometry in arriving at conclusions as to basic neurologic control of the normal and abnormal function of the bladder. It would appear that cystometry is not used with sufficient frequency in urologic clinics as a means of differential diagnosis and research. The authors have drawn interesting parallelisms between spastic voluntary musculature and what one might term a spastic urinary bladder, both resulting from interruption of cortical control. The commonly known efferent nerve fibers to the urinary bladder are the autonomic, sympathetic and parasympathetic fibers. The well known fibers of the cerebrospinal system are the somatic fibers assembled in the pyramidal tracts. The authors have shown that the central somatic system seems to establish connection not only with the lower voluntary motor neurons but also with the peripheral autonomic system of the bladder. I believe it true that pathologic lesions interrupting the pyramidal tracts frequently involve other related structures of the central nervous system. It is possible that the bladder disturbance in involvement of the pyramidal tract could be due to damage to adjacent visceral pathways. One might suppose that such visceral pathways could arise subcortically. The further postulation as to tonic control of the bladder from the midbrain centers explains satisfactorily the diminution of bladder tonus in lesions of the cord, which are so widespread as to intercept pathways both from the cortex and midbrain. The idea of central antagonistic pathways to the urinary bladder, inhibitory from the cerebral cortex and tonic from the midbrain, is most interesting and significant. It should help further to clarify problems of bladder dysfunction in lesions of the central nervous system. The work of Barrington, Dennig, Muller, Learmonth, Denny-Brown and Robertson bears out many of the significant points of this paper.

DR. MAURICE MUSCHAT, Philadelphia: Studies of relationship of the nervous system to the urinary bladder are now abundant, but they always remained a laboratory procedure and of merely academic interest. It was Dr. Rose's great contribution to apply this work at the bedside and thus aid the clinician in diagnosing a neurogenic bladder. With the simplification of the cystometer, such bedside studies have become popular. By using a water manometer, one is able to note the slightest fluctuations in the tonus of the detrusor and to evaluate the variations noted. For the ordinary clinical work of the urologist, a water manometer is somewhat unhandy and unnecessary. I feel that a practicing urologist should not as yet enter into discussions of the complicated neurologic problems. This is still the work of the neurologist. By means of the cystometer one obtains three factors: the desire to void, the pressure curve and the maximal voluntary pressure. With a normal bladder the desire is to void from 150 to 250 cc. of urine, the pressure curve is gradually ascending and the maximal pressure is from 40 to 60 mm. In the hypertonic bladder the factors are altered: The desire to void is less than 150 cc. of urine, the curve is very acute, and the maximal voluntary pressure is more than 60 mm. In the hypotonic bladder it is just the opposite: The desire is to void more than 250 cc. of urine, the curve is flat and the maximal voluntary pressure is less than 40 mm. Alteration of at least two factors is characteristic for a neurogenic bladder. The authors did not stress strongly enough the fact of finding marked abnormalities of the bladder in cases in which there were no urinary complaints. This possibility must be borne in mind and bladder dysfunction as evidenced by the cystometer looked for in every case in which a central or a spinal lesion is suspected. A positive finding becomes of inestimable value in the diagnosis of such cases.

DR. IRVING SIMONS, New York: In my clinic we have been interested in a study of the function of the bladder in various diseases, including diseases of the central and autonomic nervous systems. Physiologically the bladder should be considered as made up of two organs: (1) a detrusor or bladder proper, the contraction of which is governed by the parasympathetic nerves, and (2) an inner lock or internal involuntary sphincter, the tonus of which is governed by the sympathetic nerves. Beyond this is a second or external lock composed of the external sphincter, assisted by the bulbocavernosi and other perineal muscles. Cystometry records data merely of the action of the

detrusor, and this gives an idea only of the force but does not take into consideration the resistance that this force has to overcome. I have devised an instrument which may be termed a sphincterometer, by means of which we have been able to measure the tonus of the internal as well as the external sphincter. Clinical reports on this instrument will appear in the near future. In order to use this sphincterometer, it was necessary to construct an instrument, the portable microcystometer, which will accurately inject any amount of fluid at any rate and pressure. It will measure the tension or pressure on the bag developed by such an injection, or, if a plain catheter is used, it will measure the pressure exerted on the fluid injected into a muscular organ, the bladder. This is recorded with the greatest accuracy, as it is equipped with a reservoir type manometer of U. S. Bureau of Standards specifications, with accurately calibrated scale. The instrument is equipped with a pressure tube or intermediary, the fluid and air capacity of which has been diminished to the lowest point possible for clinical use, by which reduction the errors of pressure have been minimized and the load of fluid to be lifted by the bladder has been diminished to a point that will ensure the greatest accuracy possible. In making cystometric observations we have used the fractional injection method advised by Rose, using as the unit injections of 50 cc., injecting these increments without undue force or haste, and recording the pressure of each increment immediately so as not to allow the detrusor to relax after its reception of the increment. It is of paramount importance that the sensory filling points, of desire to void, of pain and of severe pain, be accurately elicited by questioning the patient, as without them curves of pseudoneurogenic or nonneurogenic hypertonia and hypotonia cannot be accurately differentiated from true neurogenic hypertonia and hypotonia. We feel that the accuracy of this cystometer has allowed us to separate four groups from the normal instead of the two described previously. In our work we have substituted for the graphs of Rose a numerical record similar to that of recording a gold chloride report.

DR. WILLIAM BISHER, New York: In a series of cases studied by Dr. Simons and myself by the fractional method with the microcystometer we were able to define four distinct groups that varied from the normal. Particular attention was paid in eliciting the sensory points: desire to void, pain and severe pain. We charted our results without graphs, separating the pressure obtained at each increment of 50 cc. by a comma and each 250 cc. by a semicolon. In five separate series of cases the average results obtained were as follows: 1. True neurogenic hypertonia was found in spastic paraplegia and combined sclerosis. These patients have short records averaging four increments. All the sensory points are moved to the left. 2. In nonneurogenic hypertonia, consisting of cases of increased intracystic pressure in which no essential neuropathologic condition could be found, pressure develops rapidly, usually after 200 cc. of fluid has been introduced. Their sensory points are normally situated and the average length of their record is twelve increments. 3. Normal cases show gradual rise in intracystic pressure with a record of twelve increments. The sensory points were found in the fourth, eighth and tenth increments. 4. In nonneurogenic hypotonia, neuropathologic changes were excluded clinically and serologically. Cystometrically they masqueraded as true neurogenic hypotonia because of their low tension and the length of their record. Their sensory points, normally or nearly normally placed, distinguish them from the true neurogenic hypotonia. 5. True neurogenic hypotonia was found in a series of cases of tabes and tabes with dementia paralytica. They have very long records with an average of twenty increments. All sensory points are moved to the right.

DR. LLOYD G. LEWIS, Baltimore: I wish to emphasize the value of obtaining graphic records of cystometric studies. The cystometer should be sensitive enough to record accurately every change in vesical pressure, but the graphic record is of great importance for a comparison of curves and for reaching conclusions. With our simple apparatus we have been able to record variations in blalder pressure due to respiration, variations of tonicity of bladder musculature and fluctuations due to hyperactive stretch reflex and straining pressures. It is obvious that only detrusor pressure can be determined by this instrument. Lesions of the motor pathways of the bladder in the brain and spinal cord may be studied satisfactorily by this type of apparatus. Dr. Simons' instrument may be well adapted to study of the vesical sphincters.

ARTIFICIAL FEVER THERAPY OF SYPHILIS

WALTER M. SIMPSON, M.D.
DAYTON, OHIO

Artificial fever therapy now occupies a commanding position in the management of neurosyphilis. During the eighteen years that has elapsed since the monumental researches of Wagner-Jauregg [1] in the malaria therapy of dementia paralytica, it has become more and more apparent that simple fever production is the one factor common to the great variety of infectious, chemical and physical agencies that have been employed as substitutes for malaria therapy. This observation has led to a diligent search for physical methods which would overcome the inconstancy and hazards that attend the production of artificial fever by infectious agents, such as malaria, rat-bite fever or relapsing fever. Experiments in fever production have been conducted with many physical modalities (hot baths, hot air, diathermy, radiothermy and electric blankets). While comparable clinical results may be obtained with any of these methods, it has been recognized that many possess inherent hazards.

In a previous report,[2] the early results obtained in the pyretotherapy of neurosyphilis were described. Ultra-high frequency electric currents (10,000,000 cycles, 30-meter waves) applied by means of condenser discharges of a modified short wave radio transmitter, developed by Whitney,[3] Page [4] and De Walt,[5] were applied in an air-conditioned cabinet, developed with the collaboration of Mr. Charles F. Kettering and Mr. Edwin C. Sittler of the Research Laboratories of the General Motors Corporation. The purpose of the air-conditioned cabinet was to dissipate sweat as it collected on the skin surface and thus to prevent arcing and burning of the skin as the result of concentration of the short radio waves in the drops of sweat.

Soon after this report was made, an accidental observation caused us greatly to alter the method of producing and maintaining artificial fever. While subjecting a child with congenital syphilis to artificial fever therapy by the combined radiotherm and air-conditioned

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From the Kettering Institute for Medical Research, Miami Valley Hospital.

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Read before the Section on Dermatology and Syphilology at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the author's reprints. A copy of the latter will be sent by the author on receipt of a stamped addressed envelop.

With the collaboration of Charles F. Kettering, Sc.D.; Edwin C. Sittler, B.S. in Engineering; Fred K. Kislig, M.D. (deceased); H. Worley Kendell, M.D.; Arthur M. Culler, M.D.; L. G. Kauffman, M.D.; Eunice Frazer, M.S.; Carl McD. Ritter, B.S.; Florence Storck, R.N.; Mary Louise Wolf, R.N.; Ruth Walters, R.N., and Florence Buroker, R.N.

1. Wagner-Jauregg, Julius: Ueber die Einwirkung der Malaria auf die progressive Paralyse, Psychiat.-Neurol. Wchnschr. **20:** 132-134 (Aug. 31) 1918.

2. Simpson, W. M.; Kislig, F. K., and Sittler, E. C.: Ultra-High Frequency Pyretotherapy of Neurosyphilis: A Preliminary Report, Ann. Int. Med. **7:** 64-75 (July) 1933.

3. Whitney, W. R.: Radiothermy, General Electric Rev. **35:** 410-412 (Aug.) 1932.

4. Carpenter, C. M., and Page, A. B.: The Production of Fever in Man by Short Radio Waves, Science **71:** 450-452 (May 2) 1930.

5. De Walt, K. C.: A Study of High Frequency Heating, Electronics **5:** 338, 1932.

cabinet method, the nurse-technician failed to turn on the switches controlling the output of the high frequency currents. The rectal temperature reached the desired level of 106 F. in the usual time (fifty minutes). It was then discovered that the high frequency currents had not been utilized for fever induction. By adjusting the air temperature-humidity factors in the air-conditioned cabinet the temperature was maintained at this level for the usual five hour period.

This fortunate occurrence led us to develop a much simpler, safer, less costly and more easily controllable air-conditioned apparatus (Kettering hypertherm) for fever production and maintenance (fig. 1). High frequency currents are no longer employed. Deep tissue temperature studies made with thermocouples revealed no essential difference in deep heating effect when fever was produced by either high frequency currents (diathermy or radiothermy) or by conditioned air alone.

In its present state the Kettering hypertherm [6] consists of an insulated cabinet in which the nude patient lies, with his head extending outside the cabinet. Sponge-rubber insulation is utilized in the neck region to permit the patient to shift his position. The patient lies on an air mattress, supported by a boxlike bed, which is rolled in and out at will. In the rear of the cabinet is a small insulated fire-proof compartment in which the air-conditioning apparatus is housed. The dry bulb air temperature is controlled by a thermostat. The wet bulb temperature, which governs the percentage of relative humidity, is controlled by a humidistat or by a wet bulb thermostat. The air velocity within the cabinet is controlled by blowers of fixed speed. Dry bulb and wet bulb temperatures within the cabinet are indicated on large dials, equipped with warning pilot lights, on the top of the front end of the cabinet, where they may be constantly observed by the nurse-technician. The temperature-humidity factors may be controlled by the turning of a single knob. The average set of air conditions to which the patient's body is subjected is as follows: dry bulb air temperature of from 130 to 150 F., relative humidity of from 35 to 50 per cent, and air velocity of 425 cubic feet per minute. The elevation of the rectal temperature to 105 F. is ordinarily accomplished in from forty minutes to one hour. The air is constantly conditioned by continuous passage through the air-conditioning compartment. The safety and comfort of the patient are greatly enhanced by the accurate control of the relative humidity.

The mechanism of fever induction with the Kettering hypertherm depends primarily on heat transfer by conduction from the circulating heated air. This factor, combined with prevention of the normal rate of heat loss from the body by radiation and evaporation, is responsible for the elevation of the body temperature and its maintenance at any desired level.

The simplification of the apparatus, the removal of hazards inherent in certain other physical modalities, and the supplying of large quantities (2 to 4 liters) of sodium chloride solution (0.6 per cent) by mouth during the treatment to replace chloride loss [7] have converted this form of therapy from one requiring hospitalization to one in which the patient is usually able to return to his work on the day following treatment.

6. Fifty-five of these units have been lent to twenty medical research centers, strictly for investigative purposes. The physicians and nurses charged with this undertaking received special training in the Department of Fever Therapy Research at the Miami Valley Hospital before the apparatus was released. A simpler, smaller and less costly apparatus is now being developed. It is probable that this apparatus will ultimately be available to certain qualified institutions. Adequate preliminary training of physician and nurse personnel is an essential requirement for this type of work. Artificial fever therapy should be restricted to qualified institutions. Otherwise, this method of therapy is almost certainly doomed to a period of discredit, not unlike that which followed the introduction of roentgen rays. The production of artificial fever at a high level is not adaptable to ordinary office practice.

METHOD OF TREATMENT

During the last four years we have subjected 383 patients to 2,844 artificial fever treatments (approximately 16,000 hours of sustained fever). With the exception of occasional mild skin burns, which occurred particularly at the beginning of this undertaking, no person has been injured by the treatments. Of these, 175 patients have been treated for syphilis.[8] Forty-three patients failed to cooperate, either during treatment or in the progress studies; the records of these patients are incomplete and are not included in this analysis. Forty-two patients have been under observation less than six months; these are also excluded from consideration. Sixteen patients with early syphilis have been treated with either fever therapy alone or chemotherapy alone, as control groups. One hundred and six syphilitic patients have been under observation for from six months to three and one-half years; these provide the data on which this report is based.

Many observers [9] have found fever therapy combined with or followed by chemotherapy to be more effective than fever therapy alone in the treatment of neurosyphilis. On this basis we have combined chemotherapy, usually in the form of bismuth arsphenamine sulfonate (Bismarsen), with the fever treatments. In some patients neoarsphenamine and bismuth therapy was substituted. One advantage of the induction of artificial fever by physical methods is that the antisyphilitic drug may be given during the course of fever treatments. It is our practice to inject the antisyphilitic drug half an hour before the fever treatment is begun, on the basis that the general vasodilatation which occurs during sustained high fever may permit greater diffusion of the chemical substances. Bratz [10] believes that fever produced by malaria increases the permeability of the small vessels of the brain and permits protective substances to reach the diseased brain tissues. After the ten sessions of fever therapy plus chemotherapy, twenty injections of the antisyphilitic chemical agent are given, at weekly intervals.

7. Simpson, Kislig and Sittler.[2] Simpson, W. M.: Influence of Radiotherm Pyretotherapy on Chloride Metabolism, J. A. M. A. **100:** 67-68 (Jan. 7) 1933.

8. Most of the other patients were treated for some form of gonococcic infection or for chronic infectious arthritis.

9. These include:

(*a*) Wagner-Jauregg, Julius: Malariatherapie, Wien. med. Wchnschr. **78:** 275-287 (Feb. 25) 1928.

(*b*) Wagner-Jauregg, Julius: Ueber maximale Malariabehandlung der progressiven Paralyse, Klin. Wchnschr. **13:** 1028-1031 (July 14) 1934.

(*c*) Kyrle, J.: Die Malariabehandlung der Syphilis, Wien. klin. Wchnschr. **37:** 1105-1109 (Oct. 23) 1924.

(*d*) Matuschka, J., and Rosner, R.: Die Malariatherapie der Syphilis, Vienna, Julius Springer, 1927.

(*e*) Kauders, O.: Ueber die Nachbehandlungsperiode nach Malariabehandlung der progressiven Paralyse, Wien. klin. Wchnschr. **14:** 1199-1200 (Sept. 18) 1931.

(*f*) Paige, A.; Rickloff, R. J., and Osborne, E. D.: The Treatment of Neurosyphilis, Other Than Paresis, with Malaria, New York State J. Med. **31:** 1441-1446 (Dec. 1) 1931.

(*g*) Neustaedter, M.: The Treatment of Cerebrospinal Syphilis with Malaria: A Report of Twenty-Six Cases, J. Nerv. & Ment. Dis. **73:** 591-599 (June) 1931.

(*h*) Gugenheim, F.: Das Schicksal der mit Malaria behandelten Luescerebrospinaliskranken, Ztschr. f. d. ges. Neurol. u. Psychiat. **131:** 525-541 (Jan. 24) 1931.

(*i*) Reese, H. H.: Nonspecific and Malarial Therapy in Neurosyphilis, Am. J. Syph. **13:** 348-359 (July) 1929.

(*j*) Solomon, H. C., and Epstein, S. H.: Tryparsamide in the Treatment of Neurosyphilis, New York State J. Med. **31:** 1012-1015 (Aug. 15) 1931.

(*k*) O'Leary, P. A., and Welsh, A. L.: Treatment of Neurosyphilis with Malaria: Observations with Nine Hundred and Eighty-Four Cases in the Last Nine Years, J. A. M. A. **101:** 498-501 (Aug. 12) 1933.

10. Bratz, E.: Hat sich die Malariabehandlung bei Paralyse und Tabes bewährt? Ztschr. f. ärztl. Fortbild. **26:** 560-561 (Sept. 1) 1929.

We have regarded a minimum course of artificial fever therapy for patients with syphilis to consist of fifty hours of sustained fever between 105 and 106 F. This more or less arbitrary choice is based on the observation that the highest remission rate following malaria therapy occurred in patients who had experienced at least fifty hours of fever above 102 F. The treatments are usually given in ten weekly sessions, each of five or more hours' duration. Many patients experience the most marked improvement after five or six treatments; a few require more than ten.

All patients are subjected to a thorough diagnostic survey to determine eligibility for fever therapy. Special studies are made of cardiac, vascular and renal functions, including electrocardiographic, basal blood pressure and blood chemical analyses. Blood and spinal fluid serologic reactions, spinal fluid cell count, protein and sugar content, and colloidal gold reactions are determined before treatment is begun, at the end of the combined fever-chemotherapy regimen, and at intervals of six months thereafter. As an additional control measure duplicate blood and spinal fluid specimens from these patients were submitted to Kahn in the laboratories of the University of Michigan Hospital for repetition of the serologic examinations. The Kahn standard diagnostic, presumptive and quantitative procedures were carried out in those laboratories, without any knowledge of the clinical condition of the patients, and reported to us.[11] Old age (above 60 years), cardiac or renal insufficiency, advanced cardiovascular syphilis, aortic aneurysm, and the demented form of advanced dementia paralytica are regarded as contraindications. Patients between 45 and 60 years of age are treated with great caution. One or more mild treatments are usually given such individuals as a test of cardiac function. Occasionally, treatments are spaced two weeks apart.

EARLY SYPHILIS

For centuries, laymen have known that sustained heat exerts a favorable influence on the cutaneous lesions of syphilis. The popularity of balneotherapy in many parts of the world has persisted since the ancient Greek priest-physicians first converted their thermal springs into baths. While emphasis has been placed on the mineral content of the waters, it now appears that the virtue of balneotherapy lies in its ability to produce local or general fever. The advent of scientific methods for the controlled production of fever provides a rational explanation for some of the results attained with the purely empirical use of these older methods.

Perhaps the first published observations on the artificial production of fever by balneotherapy appeared in 1884 in a paper by W. H. Phillips.[12] During a visit to Hot Springs, Ark., Phillips observed that patients who had remained in the sudatorium for long periods left with "faces flushed, eyes brightened, breathing hurriedly and sweating profusely." His curiosity aroused, Phillips experimented on himself. By gradually increasing the temperature of the bath water he elevated his mouth temperature to 103 F. At the conclusion of his stimulating paper, Phillips makes this prophetic remark: "Finally, it is when we are called upon to treat the more chronic forms of syphilitic disease that we are enabled to appreciate the immediate advantage of uniting these powerful constitutional agents [artificial fever and chemotherapy] for good."

11. The Kahn quantitative procedure was found to provide a reliable and sensitive index of therapeutic response.

12. Phillips, W. H.: Hydrotherapy, Columbus M. J. **2**: 389-402 (March) 1884.

There is a rapidly accumulating mass of experimental data which provides strong evidence of the unfavorable influence of high body temperature on Spirochaeta pallida. Many observers have reported their inability to find spirochetes in the brain tissue of patients who have died following malaria therapy.

In 1919 Weichbrodt and Jahnel[13] placed rabbits with scrotal chancres in a thermostatically controlled incubator with the air temperature at 105.8 F. The temperature elevation in the rabbits induced by this procedure ranged from 104 to 107.6 F. The rabbits were subjected to this treatment for thirty minutes once or twice daily for from three to five weeks. After the second day the spirochetes gradually lost their motility, declined in number and disappeared. The chancres healed much more rapidly than in untreated rabbits.

Schamberg and his associates[14] found that multiple hot baths exerted a favorable influence on syphilis of rabbits and human beings.

Bessemans[18] of Ghent and his associates have made valuable studies which demonstrate the feeble thermoresistance of Spirochaeta pallida. With the ingenious use of small thermocouples inserted into the scrotal chancres of rabbits it was shown that primary syphilis was cured by either local or general balneothermotherapy or aerothermotherapy when the tissue temperature of the chancre was sustained at 104 F. for two hours or 107.6 F. for one hour. Raising the rabbits' intratesticular temperature to the same levels after inoculation prevented the development of the disease.

The important researches of Carpenter, Boak and Warren[20] again emphasize the thermolability of Spirochaeta pallida and "suggest the practicality of fever therapy in the treatment of acute as well as chronic syphilis in man." Utilizing heat produced by the short radio waves of an ultra-high frequency oscillator, they were able to prevent the development of chancres in twenty-one of twenty-five rabbits when treatments were begun four, five and seven days after inoculation. In one treated rabbit a chancre developed, while the testis of another became edematous and indurated; increasing the duration and number of heatings caused the rabbits to become normal; two rabbits died. Eighteen untreated control rabbits developed the typical lesions of experimental syphilis. These workers also found that multiple unsustained fevers of from 105.8 to 107.6 F. destroyed Spirochaeta pallida in rabbits with active

13. Weichbrodt, R., and Jahnel, F.: Einfluss höher Körpertemperaturen auf die Spirochäten und Krankheitserscheinungen der Syphilis im Tierexperiment, Deutsche med. Wchnschr. **45**: 483-484 (May 1) 1919.

14. Schamberg, J. F., and Rule, Anna M.: Studies of the Therapeutic Effect of Fever in Experimental Rabbit Syphilis, Arch. Dermat. & Syph. **14**: 243-245 (Sept.) 1926; Therapeutic Effect of Hot Baths in Experimental Primary Syphilis in Rabbits, J. A. M. A. **88**: 1217-1218 (April 16) 1927; The Effect of Extremely Hot Baths in Experimental Syphilis, Arch. Dermat. & Syph. **17**: 322-331 (March) 1928. Schamberg, J. F., and Tseng, H. W.: Experiments on the Therapeutic Value of Hot Baths, with Special Reference to the Treatment of Syphilis: Physiologic Observations, Am. J. Syph. **11**: 337-397 (July) 1927.

18. Bessemans, A.; de Potter, F., and Hacquaert, R.: Sur deux formes d'aéro-thermothérapie locale des syphilomes testiculaires primaires du lapin, Compt rend. Soc. de biol. **100**: 757-760 (March 15) 1929. Bessemans, A., Vercoullie, J., and Hacquaert, R.: Nouvel essai de thermoprophylaxie sociale antisyphilitique: traitement aéro-thermique local du chancre primaire, Rev. belge sc. méd. **1**: 425-430 (May) 1929; Influence de diverses applications locales de la chaleur sur les accidents syphilitiques primaires et secondaires chez l'homme, Compt. rend. Soc. de biol. **101**: 483-486 (June 14) 1929. Bessemans, A.: The Local Application of Heat as an Adjunct in the Social and Individual Prophylaxis of Syphilis, Urol. & Cutan. Rev. **34**: 71-91 (Feb.) 1930. Bessemans, A., and Thiry, U.: New Experiences with the Application of Local Heat Therapy (Hot Water Baths and Diathermy by Long Waves Slightly Damped) in the Treatment of Primary and Secondary Syphilis in Man, ibid. **37**: 377-390 (June) 1933.

20. Carpenter, C. M., and Boak, Ruth A.: The Effect of Heat Produced by an Ultrahigh Frequency Oscillator on Experimental Syphilis in Rabbits, Am. J. Syph. **14**: 346-365 (July) 1930. Carpenter, C. M.; Boak, Ruth A., and Warren, S. L.: The Healing of Experimental Syphilis in Rabbits by Short Wave Fevers, J. Exper. Med. **56**: 751-762 (Nov.) 1932. Boak, Ruth A.; Carpenter, C. M., and Warren, S. L.: The Thermal Death Time of Treponema Pallidum in Vitro, with Special Reference to Fever Temperatures, J. Exper. Med. **56**: 741-750 (Nov.) 1932.

syphilitic lesions, as determined by reinoculation experiments. It was also found that one febrile period of six hours at a temperature of 106.7-107.6 F. was sufficient to destroy Spirochaeta pallida. The time interval between inoculations and fever treatment, or between the end of fever treatment and reinoculation, did not affect the results. Hence the fever treatment was effective at any stage of experimental syphilis in rabbits. The same authors investigated the thermal death time gradient of Spirochaeta pallida in testicular extracts in vitro. Five hours of temperature at 102.2 F., three hours at 104 F., two hours at 105.8 F. and one hour at 106.7 F. were required to render infective material innocuous to other rabbits.

Levaditi and de Rothschild [21] carried out somewhat similar experiments in which thermocouples were used to determine local temperature, with less constant results. In many of the rabbits rapid healing of the primary lesions, disappearance of spirochetes, sterilization of lymph glands and negative serologic reactions occurred. Levaditi regards artificial fever as an effective factor in stimulating the defense mechanism. Kolmer and Rule [22] demonstrated that the testicular lesions were prevented and the inguinal lymph glands became sterile if rabbits inoculated intratesticularly with Spirochaeta pallida four days previously were immersed in water at 113 F. for twenty minutes daily for fifteen days. If, however, the testicular lesions were kept out of the heated water, active syphilitic lesions developed. These authors [23] also found that fever of from 2 to 5 degrees F. which lasted several hours and which was induced in the rabbit by intravenous injections of increasing amounts of typhoid-paratyphoid vaccine or Coley's fluid showed much less effect on the course of acute testicular syphilis than did fever induced by hot baths.

We have confirmed the observations of Carpenter, Boak and Warren by a somewhat different experiment. Six male rabbits were inoculated intratesticularly with fresh testicular extract containing the Nichols strain of Spirochaeta pallida. Only rabbits with negative Kahn and Kolmer serologic reactions were selected. Chancres or syphilomas developed in both testes of all the animals within four to six weeks. Aspiration revealed the presence of spirochetes in all. The serologic reactions of all were strongly positive at the end of eight weeks. Hemicastration of each rabbit was then done. The testicular emulsion derived from the extirpated testis of each of these six rabbits was then injected into the testes of each of a new series of six seronegative normal rabbits; all developed chancres and positive serologic reactions in the usual time. Immediately after hemicastration, the syphilitic rabbits were subjected individually to sustained rectal temperature of from 107.1 to 108.1 F., average 107.6 F., for six hours, 30-meter waves of a high frequency oscillator being used. The remaining testis was then removed from each rabbit four days after the fever treatment. Injection of testicular suspensions from each heated rabbit was made into the testes of each of a new series of seronegative normal rabbits; none developed evidence of syphilis; the serologic reactions of all remained negative.

It is quite conceivable that the same uniformity in results might not obtain following the application of fever therapy to human subjects. Syphilis in rabbits apparently pursues a somewhat milder course; generalized lesions and central nervous system involvement are comparatively rare. Nevertheless, these experimental studies provide incontrovertible evidence of the spirochetocidal effect of sustained high body temperature. Many observers are convinced that fever therapy is capable of producing a distinctly favorable influence on the progress of early syphilis, particularly when fever therapy is combined with orthodox chemotherapy. Kyrle [9c] gave 232 seropositive patients with early syphilis (under two years' duration) a course of arsphenamine (from 4 to 6 Gm.), followed by malaria therapy (ten chills), followed in turn by another course of arsphenamine therapy. The results were incomparably better than by any other method employed. Of the 232 seropositive patients with early syphilis, the blood serologic reactions were favorably influenced in 230 (99.1 per cent) after a single combined arsphenamine-malaria-arsphenamine course. Fifty-four of these patients had exhibited positive spinal fluid reactions. All were reversed to negative and remained negative. When Matuschka and Rosner [9d] reported on the work of Kyrle after his untimely death, not one of these patients had relapsed, clinically or serologically, during five years of observation.

In the introduction to the Matuschka-Rosner monograph,[9d] Finger makes this statement: "The results are significant. They show that in the early period of syphilis nothing influences the serum and spinal fluid reactions so favorably as combined malaria arsphenamine therapy, that a single course is usually sufficient and that the earlier the treatment is begun, the better are the results."

Kemp and Stokes [24] found that fever therapy induced by bacterial proteins, combined with arsphenamine therapy and followed by arsphenamine and bismuth therapy, offered a more satisfactory outlook in the treatment of early syphilis than routine chemotherapy alone.

Richet and Dublineau,[25] after experimentation with animals and human subjects, conclude that early syphilis may be "cured" more rapidly and more certainly by combined fever and chemotherapy than with chemotherapy alone. The blood serologic reactions of thirty-five of thirty-seven patients with primary and secondary syphilis became negative during or at the end of one course of pyretochemotherapy.

Wagner-Jauregg,[9a] O'Leary,[26] Jacobs and Vohwinkel,[27] Bering [28] and others have repeatedly emphasized that the best form of treatment of neurosyphilis lies in its prevention by combined fever and chemotherapy during its asymptomatic phase. The extensive cooperative clinical studies carried out by Stokes, Cole,

21. Levaditi, C., and de Rothschild, H.: Etude expérimentale de la thermothérapie générale par les radiations à ondes courtes, Ann. Inst. Pasteur, **52**: 23-67, (Jan.) 1934.

22. Kolmer, J. A., and Rule, Anna M.: Hot Baths in Experimental Primary Syphilis of Rabbits and in Trypanosomiasis of Rats, Arch. Dermat & Syph. **27**: 660-662 (April) 1933.

23. Kolmer, J. A., and Rule, Anna M.: Bacterial Protein Fever in the Treatment of Syphilis in the Rabbit, Arch. Dermat. & Syph. **24**: 546-553 (Oct.) 1931.

24. Kemp, J. E., and Stokes, J. H.: Fever Induced by Bacterial Proteins in the Treatment of Syphilis, J. A. M. A. **92**: 1737-1740 (May 25) 1929.

25. Richet, C., Jr., and Dublineau, J.: Pyréto et chimiothérapie associées dans le traitment de la syphilis du lapin, J. de physiol. et de path. gén. **31**: 794-811 (Sept.) 1933. Richet, C., Jr., Dublineau, J., and Joly, F.: Pyréto et chimiothérapie associées dans la syphilis primaire et secondaire: étude expérimentale et clinique, Presse méd. **41**: 1649-1651 (Oct. 25) 1933. Richet, C., Jr., and Dublineau, J.: La pyrétothérapie de la syphilis, Paris méd. **1**: 197-205 (March 3) 1934.

26. O'Leary, P. A.: Treatment of Neurosyphilis by Malaria, J. A. M. A. **91**: 543-545 (Aug. 25) 1928; Treatment by Malaria in Asymptomatic Neurosyphilis, ibid. **97**: 1585-1587 (Nov. 28) 1931.

27. Jacobs, J., and Vohwinkel, K. H.: Die Malariatherapie der Früh- und Spätlues, Dermat. Ztschr. **57**: 321-346 (Jan.) 1930.

28. Bering: Die Malariabehandlung im Frühstadium der Syphilis des Zentralnervensystems, Zentralbl. f. Haut- und Geschlechtskr. **17**: 41 (June 5) 1925.

Moore, O'Leary, Wile, Clark, Parran and Usilton [29] reveal that abnormal spinal fluid conditions were present in 33 per cent of patients with early syphilis, and in 56.1 per cent of patients with late secondary syphilis. The same observers have also stated that "even thoroughgoing [chemical] treatment does not necessarily prevent the development of abnormalities of the spinal fluid" [29b] and that in latent syphilis "almost all of the serologic response to be expected occurs within the first four months of treatment; thereafter further [chemical] treatment has little effect." [29c]

On the basis of the foregoing observations it seems logical to conclude that the best results are obtained when combined fever and chemotherapy are applied early in the disease. With the hope that the disastrous late neurologic and visceral manifestations of the disease might be prevented, we have subjected twenty-six patients with primary and early secondary syphilis to the combined fever and chemotherapy regimen (fifty hours of sustained fever above 105 F. and thirty injections of antisyphilitic chemotherapy). All these patients have been under observation for from six months to two and one-half years. None had received any previous treatment. As a control measure, six patients with primary or early secondary syphilis were treated with only fifty hours of fever therapy above 105 F. In two cases, clinical relapse (cutaneous eruption) occurred following the fever treatments; chemotherapy was promptly instituted. Of the four patients who have had fever therapy alone, the Kahn and Kolmer serologic reactions became less positive in three and more positive in one. The spinal fluid reactions remained negative in all.

A second control group of fourteen patients with primary or early secondary syphilis received only the thirty weekly injections of chemotherapy. Clinical evidence of relapse (cutaneous eruption) occurred in two patients; fever therapy was then given, with prompt remission of the skin lesions. Of the twelve patients who received only chemotherapy, the Kahn and Kolmer serologic reactions were reversed to negative in five, became less positive in six and became more positive in one. The spinal fluid reactions remained negative in eleven and were reversed to negative in one.

Including the four patients who were transferred from the two previous control groups, twenty-six patients with primary and early secondary syphilis were treated with combined fever and chemotherapy. The cutaneous manifestations of the disease, including the chancres, responded with surprising promptness (figs. 2 and 3). The Kahn and Kolmer serologic reactions were reversed to negative in fourteen, became less positive in ten, remained positive in one and remained negative in one. The ten patients whose serologic reactions became less positive, and the one patient whose serologic reactions remained positive by the Kahn and Kolmer standard diagnostic tests have been under observation for only six to nine months. Progressive decline in the intensity of the serologic reactions, as measured by the Kahn quantitative procedure, has occurred in all. The spinal fluid reactions remained negative in twenty-three and were reversed to negative in three. There has been no evidence of clinical or serologic relapse in the patients treated with combined fever and chemotherapy.

With due regard to the small number of patients and the short interval of observation, these observations provide suggestive evidence that fever therapy alone or chemotherapy alone (as applied to these patients) is often inadequate. These observations also suggest that combined fever and chemotherapy is a distinctly advantageous form of treatment for early syphilis, particularly in those patients who do not respond promptly to orthodox chemotherapy. It must be appreciated that this is strictly a preliminary report of the response of early syphilis to combined fever and chemotherapy. Every effort will be exerted to follow the progress of these patients, and others who follow, throughout their lifetime.

Under existing circumstances, strong forces operate to keep the patient with early syphilis from receiving adequate treatment. It requires about eighteen months of continuous therapy in cases of early syphilis and an indefinitely longer period for the treatment of late syphilis.[30] The high cost and inconvenience to the patient often result in inadequate treatment. More than 500,000 persons in the United States seek treatment for early syphilis each year.[31] Any method that would appreciably decrease the time and expense involved in providing adequate therapy is worthy of thoughtful consideration. A growing body of evidence appears to indicate that artificial fever therapy fortifies and intensifies the curative action of chemotherapeutic agents. The advent of simpler and safer methods for the induction and maintenance of artificial fever should stimulate vigorous investigation of this possibility.

NEUROSYPHILIS

Dementia Paralytica.—Twenty patients with dementia paralytica have completed the course of fifty hours of fever therapy plus thirty injections of chemotherapy. Twelve have experienced complete clinical remission; two have been restored to a working status. Thus, fourteen patients (70 per cent) have been socially rehabilitated. Four patients were accorded 50 per cent clinical improvement; two were regarded as having received 25 per cent improvement. No relapse has occurred following treatment. Six of these patients had advanced dementia paralytica; four had been committed to a hospital for the mentally diseased. Thirteen of the twenty patients had received presumably adequate chemotherapy; two had relapsed after receiving malaria therapy; five had received no treatment.

The Kahn and Kolmer serologic reactions were reversed to negative in four, became less positive in nine and remained positive in seven. Spinal fluid Kahn and Kolmer reactions were reversed to negative in five, became less positive in seven, remained positive in six, and became more strongly positive in two. The level of the colloidal gold reactions was reduced in twelve, elevated in three and unchanged in five.

As with fever therapy induced with malaria, there is no parallelism between the immediate clinical response and the serologic or colloidal gold reactions. In most instances the serologic reactions become negative or less positive during a period of several months following the treatment.

Tabes Dorsalis.—The ten patients with tabes dorsalis had received chemotherapy previously. One had also received five malaria inoculations, followed by a temporary remission after the first inoculation. Two other patients had received malaria therapy. Ataxia (in nine

29. (*a*) Stokes, J. H.; Cole, H. N.; Moore, J. E.; O'Leary, P. A.; Wile, U. J.; Clark, Taliaferro; Parran, Thomas and Usilton, Lida J.: Cooperative Clinical Studies in the Treatment of Syphilis, Ven. Dis. Inform. **13**: 165-182 (May 20) 1932; (*b*) ibid. **13**: 253-292 (July 20) 1932; (*c*) ibid. **14**: 1-12 (Jan.) 1933.

30. Exner, M. J.: The Value of Instructing the Syphilis Patient, Ven. Dis. Inform. **16**: 59-64 (March) 1935.

31. Usilton, Lida J.: Trend of Syphilis and Gonorrhea in the United States, Ven. Dis. Inform. **16**: 147 (May) 1935.

patients) and lancinating pains or gastric crises (in all) were the chief complaints. Two patients with ataxia of three months' duration in one case, and of two years' duration in the other, were restored to normal gait. Six patients obtained some improvement in gait while two showed no change. There appeared to be a direct relationship between the degree of improvement and the duration of the gait disturbance.

The root pains were abolished in all. Often the pains disappeared after the first two or three treatments. Recurrence of pains occurred in one patient after the usual course of treatments. This was controlled by additional treatments. Normal function was restored in one case of so-called cord bladder.

The Kahn and Kolmer serologic reactions were reversed to negative in four patients, became less positive in three, remained negative in one and remained positive in two. The spinal fluid reactions were reversed to negative in two, became less positive in three, remained positive in four and became more positive in one.

Tabetic Form of Dementia Paralytica.—Seven patients with the tabetic form of dementia paralytica were subjected to the combined treatment. All had previously received chemotherapy; one had also had malaria therapy, followed by a remission lasting six months. Improvement in mental orientation occurred

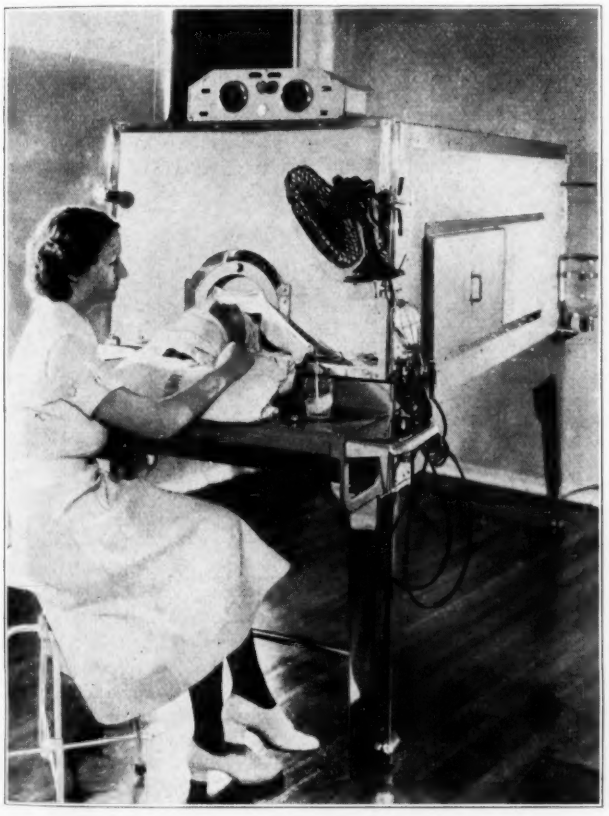

Fig. 1.—The Kettering hypertherm.

in six; one demented patient showed no improvement and died seven months after the treatment was completed. Subsidence of root pains occurred in all; in two instances additional fever treatment was required. Improvement in gait occurred in four of the five patients with ataxia; one patient who had had a tabetic gait for three months was restored to normal gait. One patient with a "cord bladder" regained normal control of bladder function.

The Kahn and Kolmer serologic reactions were reversed to negative in two instances, became less positive in one, remained negative in three and remained positive in one. The spinal fluid Kahn and Kolmer reactions were reversed to negative in four, became less positive in one and remained positive in two.

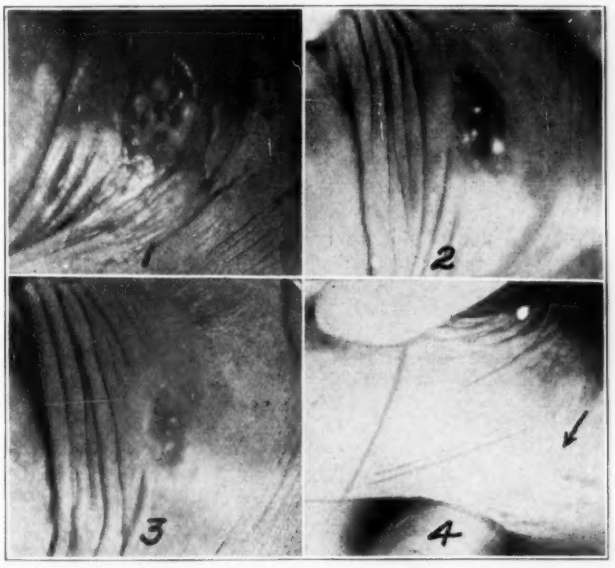

Fig. 2.—1. Appearance of hard chancre of penis March 23, 1933, one day before pyretochemotherapy; numerous motile spirochetes. 2. Appearance of chancre March 26, two days after first treatment; no spirochetes present. 3. Appearance of chancre March 28, four days after first treatment; no spirochetes present. 4. Complete healing of chancre, April 3, three days after second treatment.

Diffuse Central Nervous System Syphilis.—In this group are placed thirteen patients with various manifestations of symptomatic neurosyphilis which could not be definitely classified as dementia paralytica, tabes dorsalis or the tabetic form of dementia paralytica. All but one had received antisyphilitic therapy. There were six cases of congenital syphilis and seven cases of acquired syphilis. In this group were nine cases in which ocular symptoms predominated.[33] Symptomatic remission occurred in nine of the thirteen patients, moderate improvement in three and no improvement in one. The Kahn and Kolmer serologic reactions were reversed to negative in one, became less positive in seven, remained positive in four and became more positive in one. The spinal fluid Kahn and Kolmer reactions were reversed to negative in five, remained negative in seven and remained positive in one.

Asymptomatic Neurosyphilis.—Of seven patients with asymptomatic neurosyphilis, all of whom had previously received apparently ineffectual chemotherapy, the spinal fluid Kahn and Kolmer reactions were reversed to negative in six and became less positive in one. The blood Kolmer and Kahn reactions were reversed to negative in four, remained negative in two and remained positive in one. None have shown evidence of serologic relapse.

RESISTANT SEROPOSITIVE SYPHILIS

Included in this study were seven patients with so-called Wassermann-fast or what I prefer to term resistant seropositive syphilis. All had had presumably adequate chemotherapy. The Kahn and Kolmer serologic reactions were reduced to negative in four,

33. The results obtained in these cases and in others manifesting ocular complications of syphilis will be discussed in a separate report by Arthur M. Culler and Walter M. Simpson, in a forthcoming issue of the Archives of Ophthalmology.

became less positive in two and remained positive in one. The spinal fluid reactions remained negative in all. Serologic relapse has not occurred in any of these patients.

SUMMARY AND CONCLUSIONS

1. The value of artificially induced fever therapy as an adjunct to chemotherapy in the management of neurosyphilis is now firmly established. The one factor common to the wide variety of infectious, chemical and physical methods that have yielded comparable therapeutic results is simple fever production.

2. A simplified, controlled and relatively inexpensive method for fever induction and maintenance (Kettering hypertherm) has been devised. High frequency electric currents are not employed. During the past four years, 383 patients have been subjected to 2,844 artificial fever treatments, without any serious ill effects related to the method of treatment.

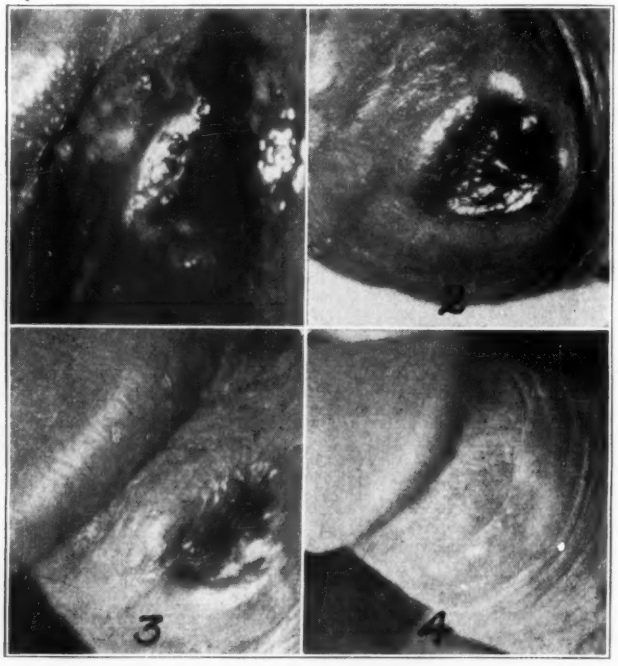

Fig. 3.—1. Appearance of secondarily infected hard chancre of penis July 6, 1933, the day before pyretochemotherapy; numerous motile spirochetes. 2. Appearance of chancre July 10, three days after first treatment; no spirochetes present. 3. Appearance of chancre July 15, one day following second treatment; no spirochetes present. 4. Complete healing of chancre, July 19, five days following second treatment.

3. The frequent observation that the best results occurred when neurosyphilis was treated by combined fever and chemotherapy during its earliest manifestations led us to apply the treatment to patients with primary or early secondary syphilis. The results provide evidence that fever therapy may be of great value in early syphilis, particularly when chemotherapy alone appears to be inadequate.

4. The results obtained in the treatment of symptomatic neurosyphilis, asymptomatic neurosyphilis and resistant seropositive syphilis are at least comparable to the results obtained with the more hazardous, time consuming and inconstant malaria therapy.

5. Hospitalization is not a requirement for fever therapy by physical means.

6. The advent of simple and safe methods for the production of artificial fever should stimulate vigorous investigation of the possibility that the time, effort and expense involved in the adequate antisyphilitic therapy may be greatly lessened.

7. There is evidence that artificial fever therapy fortifies and intensifies the action of antisyphilitic chemotherapeutic agents. It would appear that the therapeutic armamentarium of the syphilologist is now provided with a new and powerful weapon.

ABSTRACT OF DISCUSSION

DR. FRANK R. MENAGH, Detroit: The development of a practical air-conditioning cabinet that with the least discomfort to the patient will produce a controlled fever has been an achievement. The cabinet that Dr. Simpson and his associates have developed, with adequate apparatus for the easy control of temperature and relative humidity, has been at least in part responsible for the satisfactory results obtained. The accessibility of the patient for examination and treatment at all times is of great importance when it is remembered that the fever is maintained for five hours and that an extra hour is necessary to raise the temperature to 105 F. or above. Since the autumn of 1933, my associates and I have had one or more of these hypertherms in our clinic and I wish to report our experience with one group of patients treated with this cabinet. Any one who follows the treatment of syphilis over a period of fifteen years gradually accumulates a group of problems in the form of patients who do not respond to the usual treatment with arsenicals, bismuth compounds, mercury and the iodides, and in whom the malarial type of fever is inadvisable. A group of twenty-five such patients were given fever therapy. There were in this group twenty men and five women. They ranged in age from 17 to 63 years, with an average age of 41 years. These patients had been under observation and treatment by us for an average period of four years and four months, the longest period being more than ten years. These were given an average of 10.3 treatments each, a few receiving more than fifty hours of fever, and a few less. Twenty-one were given additional antisyphilitic therapy. As a result of treatment, this especially refractory group showed twenty-two improved patients, two unimproved and one who died. The patient who died, although he had syphilis, was found at autopsy to have had a brain tumor. The two unimproved patients had tabes, with tabetic pain and ataxia. They were thin, emaciated individuals and did not stand the fever well. In the improved group were eleven patients with syphilis of the parenchymatous type; that is, positive spinal fluids with paretic gold curves, some of them with mild mental changes. This group did very well. Those with mental symptoms all improved, and at the present, one year after their treatment, none of the cases can be considered clinically active. This was the group that through the years had given us the greatest concern. There were six cases of tabes dorsalis, one with partial optic atrophy. The optic atrophy was arrested and apparently improved somewhat, owing perhaps to the clearing of edema. I do not believe that any destroyed nerve fibers were ever regenerated. The remaining five patients never had a positive spinal fluid.

DR. CLARENCE A. NEYMANN, Chicago: Momentous changes have come about since electropyrexia was first introduced by Neymann and Osborne in 1929, based on researches begun in 1927. We have seen it develop into an accepted therapy for the treatment of certain diseases, such as neurosyphilis and some forms of arthritis, while we are not yet sure of its efficacy in a host of other conditions to which hyperpyrexia is being applied. In this connection I might mention early syphilis, asthma, chorea minor, gonorrhea and lately even malignant neoplasms. With the spread of the popularity of fever therapy induced by physical agents, a great number of machines are being marketed. I believe that a perfect fever machine does not exist. As this therapy becomes better established, a more refined technic will undoubtedly be introduced. We have lately devised a cabinet the temperature of which closely approximates that of the patient's body at all times without in itself causing fever. We depend on electromagnetic induction for actually producing the fever. This method would seem to answer all questions of comfort and safety and yet not disturb the basic physiologic relationships, which are reversed whenever external heat is applied. After all, the external surface of the body is from 2 to 7 degrees F. cooler than the interior.

The question of the modality or the machine used is of minor importance. The experience of the physician and his assistants is the main problem. I would stress the value of schooled personnel rather than the promotion of the use of a specific machine. I am sure that Dr. Simpson agrees with me in this. During the last three years, Dr. Theodore K. Lawless, Mr. S. L. Osborne and I have been working with primary syphilis. Chancres always disappear ten days after treatment with fever alone. Microscopic sections of chancres show spirochetes undergoing dissolution, both in the chancre and in concomitant inguinal lymph glands after one session of fever. I agree with Dr. Simpson that fever therapy alone and chemotherapy alone are often inadequate for the treatment of all forms of syphilis, both early and late. Bessemans, Van Haelst and De Wilde have shown that spirochetes found in the lymph glands of rabbits, guinea-pigs and mice are much more virulent and much more resistant to heat and chemotherapy than those obtained from concomitant chancres and skin lesions. These spirochetes have adjusted themselves to a more unfavorable environment. We have treated seven cases of primary syphilis with fever alone. Five of these developed late secondary syphilitic symptoms in the course of years. Two have remained free from all syphilitic manifestations.

DR. ALBERT N. B. LEMOINE, Kansas City, Mo.: Hyperpyrexia produced by malaria is one of the most valuable agents in the treatment of neurosyphilis. However, as pointed out by Dr. Simpson, it has disadvantages. Many of these can be overcome by production of fever by physical means. The various types of cabinets used have proved to be effective. However, the fact that a cabinet is necessary prohibits its universal use. Further, many patients rebel against the prolonged treatment with these cabinets. To overcome these objections, Drs. Charles Dennie and Polsky and I have adopted the hot bath treatment for cases of neurosyphilis and all manifestations of late or congenital syphilis. It has been found that such a course of treatment supplemented by chemotherapy gives much better results than was possible by chemotherapy alone. However, we did not treat these patients with chemotherapy and the hot bath treatment at the same time, as did Dr. Simpson. We used the hot bath treatment followed by chemotherapy. In some cases the results obtained were little short of miraculous. An ordinary tub is used in which the patient is submerged to the neck and covered with a poncho of light rubber. For the first hot bath, the temperature of the water is started at 98 F. and gradually increased to 102. This temperature is maintained for ten minutes. The second treatment two days later begins with a temperature of 100, is increased to 104 and is maintained for ten minutes at this temperature. The subsequent baths at two-day intervals are all started at 100 and increased 4 degrees on each day, until 112 F. is reached and maintained for fifteen minutes. This temperature should elevate the body temperature to over 104. In some cases, a temperature of 106.5 was obtained. The best time to give these baths is just before retiring for the night. After the bath, the patient should be immediately wrapped in a woollen blanket and allowed to cool off for an hour or two. We have found that maintaining the high temperature for fifteen minutes gives as good a result as an hour or two. The contraindications are the same as with the cabinet. We have treated cases of practically all types of late or congenital syphilis by this method that would not heal with chemotherapy, and all these latent cases of syphilis made remarkable improvement and the patients stayed well after using chemotherapy following the heat therapy. From this work we concluded that fever produced by the hot bath was a very effective therapeutic measure in late syphilitic lesions that were resistant to chemotherapy.

DR. M. F. ENGMAN JR., St. Louis: It seems rather difficult to divorce the foreign protein reaction or the thought of the foreign protein mechanism from all these heat applications. It is impossible to say that it is the heat alone which has accomplished the good results. In 1915, Dr. Engman Sr. began using shock therapy with typhoid in various diseases. He used it in lupus erythematosus annularis and in one or two cases of early syphilis. Later he conceived the idea of trying to mobilize in every way whatever defense mechanisms exist in the body against disease, in an entirely nonspecific way. One of these methods was foreign protein injection; that is, typhoid serum intravenously. Another was the use of iodide, and he even thought that giving thyroid by mouth might increase the metabolism and help the desired result. So the idea was to do them all at once. We treated about thirty cases of early syphilis, chancres and early secondary syphilis. We would prepare the patients with a high carbohydrate diet for a couple of days before the injection, then have them on a small dosage of thyroid, and on a moderate dose of iodide. Then the patients were given an injection of typhoid bacilli intravenously, 25,000,000, then 50,000,000, 75,000,000 and so on, and a fever of about 102 to 105 was produced. When the fever reached its height, we gave 1 cc. of 1 per cent mercury bichloride in physiologic solution of sodium chloride intravenously, hoping, as Dr. Simpson mentioned, that the increased capillary permeability would permit the mercury to have its desired effect. Our results in these thirty cases were not encouraging. We found that many of the patients would suffer from an almost toxic type of general debility. Some lost almost 25 pounds (11 Kg.) not attributable to the syphilis. The quantitative Kahn reactions were reduced, but with simultaneous studies in ordinary routine, arsphenamine, and preparations of mercury and bismuth, in the clinic, this treatment was not as good, or if it was as good, it was not superior. So we felt at the end that we might have benefited these patients somewhat. Then we put all of them on routine therapy, but our results in this routine were not particularly encouraging. We published the results in THE JOURNAL about four years ago.

DR. JOHN H. STOKES, Philadelphia: It should be pointed out that under no circumstances should the impression go out from this section or from syphilologists or fever therapists in general that primary and secondary syphilis are to be generally or uniformly dealt with by fever therapy. About all, it is unwise to create the impression that fever therapy can or should be expected in the near future to displace the now matured and carefully developed international and national systems for the chemotherapeutic management of early syphilis. This section and syphilologists in general can and, I believe, should stand solidly for the application by all practitioners throughout the world of the standard worked out by the Health Organization of the League of Nations and the Cooperative Clinical Group with the United States Public Health Service in this country. These modes of treatment are supported by the largest material that has ever been accumulated, and to their procedures and their conclusions for some time to come all other methods must be regarded as adjunct and subordinate. Especially is this true of the application of fever therapy to primary and secondary syphilis. These phases of the disease demand for their public health control chemotherapeutic methods of management which are accessible and easily available rather than esoteric and highly specialized. They must be applied on a grand, in fact a universal, scale. The effectiveness of such methods, thus universally applied, is no longer a matter for serious discussion or dispute. Fever therapy is fundamentally unable at the present time, even granted a demonstrated comparable effectiveness, to meet the situation as it stands. It is, as its proponents repeatedly insist, a highly specialized form of procedure, requiring special apparatus, trained personnel and centers for its application, and there are comparatively few people equal to its responsibilities and few people able to avail themselves of its advantages. On the face of it, this must for the time being discredit any procedure for the control of primary and secondary syphilis as a vast public health problem. The practitioner should treat early syphilis chemotherapeutically by the new standards and not vacillate over the possible but as yet unproved and comparatively inaccessible advantages of fever therapy in this phase of the disease.

DR. PAUL A. O'LEARY, Rochester, Minn.: I have observed Dr. Simpson's work since its inception. The scientific manner in which he has studied these patients, not only while they are in the fever chamber but also subsequently to note the serologic results, is worthy of comment. I think that his suggestion in regard to the use of saline solution by mouth during the course of fever has been of material value not only to patients in the hypertherm chamber but also to those who are undergoing malaria therapy. There is nothing for the mechanotherapists, the fever therapists and the chemotherapists to argue about so

far as the results of the treatment of syphilis are concerned. The therapeutic results from malaria and treatment with the fever-producing units are quite similar. Likewise, the unfavorable results from treatment with these units and with malaria are comparable. There are about 10 per cent of patients who cannot take malaria and about 10 per cent of patients who cannot tolerate these various fever units. I think that the argument against malaria, viz., that it requires hospitalization, is not a very valid one, since for malaria therapy from twelve to fourteen days in the hospital is required at one time in contrast to a day in the hospital every week for a similar total for the hypertherm treatment. Hence we fever therapists have nothing to argue about; we are all in accord. The only point that we have to discuss is the mechanism by which these results are produced, and unfortunately we don't know very much about this. I have been more interested in malaria therapy because I felt that there was a biologic interreaction of some sort between Spirochaeta pallida and Plasmodium vivax, the nature of which is unknown. The part played by the reticuloendothelial system or the changes in the plasmocytes has been suggested, but neither of these theories is established as yet. I have felt, however, that fever alone was not the sole cause of the therapeutic effects, because I have observed that patients who underwent malaria therapy for active neurosyphilis which appeared during the stage of acute syphilis have developed cutaneous and mucous membrane recurrences six months or more after the fever treatment; likewise, the appearance of cutaneous gumma in paretic patients following fever therapy is evidence that the spirochetes were not destroyed by the "heat." Even more significant is the fact that the good results from fever therapy require a year or more to develop; they do not appear in a few weeks or months, as is noted following the use of arsphenamine. Perhaps the biologic reaction is a catabolic one, the result of the destructive process that occurs as a consequence of the fever.

DR. WALTER M. SIMPSON, Dayton, Ohio: As Wade Brown, Louise Pearce and others have pointed out, there is no chemical agent that will insure complete sterilization in the treatment of syphilis. It is apparent that the action of antisyphilitic chemotherapeutic agents is to stimulate natural immune processes. Fever therapy apparently provides an additional immunologic stimulus. It is quite possible that patients with early syphilis have been given too much fever therapy. It is quite conceivable that a smaller amount of artificial fever would be equally effective. The treatment of a series of early syphilitic patients has been begun, ten fever treatments being given at intervals of from three to five days, of two and one-half to three hours' duration at from 105 to 106 F., combined with chemotherapy (total dosage of 9 Gm. of neoarsphenamine and 6 Gm. of metallic bismuth). The least important factor in artificial fever therapy is the apparatus. The potentialities for harm in the hands of unskilled or unscrupulous persons probably exceed any benefits that might be derived from it. The application of fever therapy to early syphilis should be regarded as a strictly experimental undertaking for the next several years. I am glad that Dr. Stokes referred to the public health aspects of this problem. Physicians now have at their command the means with which to abolish syphilis and gonorrhea from the face of the earth. Little can be accomplished, however, until the public has been aroused as to the appalling disasters wrought by these diseases. Wide publicity has been the most potent weapon in the successful warfare against smallpox, yellow fever, typhoid, diphtheria and tuberculosis. The gains that are now being made in the fight against cancer are due to a large measure to organized lay publicity. No great gains can be made in the conquest of syphilis and gonorrhea until the unreasonable prejudce against the dissemination of sound information to the millions of actual and potential victims of these diseases has been abolished. To regard these diseases as just punishment for sinfulness is to deny the innocent acquisition of these diseases in a great proportion of cases. Organized molding of public opinion is a fundamental requirement if the enormous human wastage due to the present lack of control of these diseases is to be prevented. New heights of absurdity were reached recently when a radio broadcasting company refused to permit an acknowledged authority to deliver a speech on the public health aspects of the problem because the word "syphilis" was to be mentioned.

GROWTH ARREST IN LONG BONES AS RESULT OF FRACTURES THAT INCLUDE THE EPIPHYSIS

EDWARD L. COMPERE, M.D.
CHICAGO

The importance of the growth cartilage of the long bones has been emphasized by embryologists and anatomists, but the ease with which growth may be arrested as the result of infection that injures the cartilage plate or by direct violence, which may be produced by the surgeon who is careless in his operative approach or may be secondary to fractures or crushing injuries in the region of the ends of the long bones, is not always appreciated by those who are called on to treat the lesions of the extremities of growing children.

Haas [1] has stated that trauma is the most frequent cause of disturbances of growth in bones. He further states that the greatest growth activity is localized in the cartilage columns on the metaphyseal side of the epiphyseal cartilage plate and that, after the destruction of this portion of the growth cartilage, length growth practically terminates. In a series of experiments on young dogs and cats in which he damaged the growth cartilage itself, the epiphysis or the metaphysis in various ways, he found that injury to the epiphysis alone or to the metaphysis alone caused very little change in the rate or extent of growth of the extremity. On the other hand, injuries in the shaft of the bone that extended to and across the epiphyseal line, injuries to the epiphysis that included in the applied trauma a portion of the cartilage plate, or direct insult to the growth cartilage alone did cause an early closure or a complete arrest of growth from the traumatized end of the bone.

TABLE 1.—*Fractures of the Long Bones Treated at the University of Chicago Clinics from October 1927 to May 1935*

Total number of patients treated for fractures of long bones	693*
Total number of fractures of long bones	819*
Children with fractures of long bones, 14 years of age or younger at time of fracture (34% of total fracture cases)	211
Fractures of long bones in children 14 years of age or younger at time of fracture (35% of total number of fractures)	290
Children with fractures of epiphyses or of fractures of the shaft that crossed the epiphyseal line	37
Fractures, in children, of epiphyses or of fractures of the shaft that crossed the epiphyseal line (14.4% of all the fractures in children)	42

* Includes five pathologic fractures.

Gatewood and Mullen [2] have also shown that immediate closure of the epiphyses resulted from the destruction of the epiphyseal cartilage plate on the side nearest the joint. Interruption of the extrinsic blood supply to the epiphysis, by stripping away the periosteum at the site of the epiphyseal cartilage, caused this epiphysis to fuse to the shaft earlier than in the control limb, although there was no immediate arrest of growth.

Haas has also warned against the stripping of soft parts from the edges of the epiphyseal cartilage plate. He has stated that surgery of the extremities of chil-

From the Division of Orthopaedic Surgery of the Department of Surgery, University of Chicago.

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1. Haas, S. L.: The Changes Produced in Growing Bone After Injury to the Epiphyseal Cartilage Plate, J. Orthop. Surg. **1**: 67 (Feb.), 166 (March), 226 (April) 1919; Growth Disturbances Following Resection of Joints, Arch. Surg. **13**: 56-63 (July) 1926.

2. Gatewood and Mullen, B. P. Experimental Observations on the Growth of Long Bones, Arch. Surg. **15**: 215-221 (Aug.) 1927.

dren that did not take into consideration the danger of growth arrest has caused many growth disturbances and deformities. He demonstrated in experimental work that the mere passage of sutures through the actively growing columns of cartilage cells of the cartilage plate resulted in the arrest of growth.

During the seven and one-half years since the opening of the clinics at the University of Chicago, I have seen a group of cases showing deformities that developed as a result of fractures that crossed the epiphyseal cartilage and produced partial or complete growth arrest. Growth disturbances due to fractures were thought to be relatively uncommon, but factual data to support this belief could not be found. A study of all the fractures of the long bones that had been treated in the University of Chicago Clinics from October 1927 to May 1935 to determine as nearly as possible the incidence of fractures with growth arrest was made. The results of this study are shown in table 1. Patients treated for fractures of the long bones reached a total of 693, with a total number of 819 fractures; 211, or 34 per cent of the total number of fracture cases studied, were in children 14 years of age or younger at the time the fracture occurred. In this group of children were 290, or 35 per cent of the total number of fractures. In thirty-seven of the 211 cases, the fracture involved the growth cartilage.

TABLE 2.—*Cases in Which Fractures of the Long Bones Extended to or Crossed the Epiphyseal Lines*

Patient	Age at Time of Fracture	Sex	Location of Fracture	Date of Fracture	Admission to U. of C. Clinics for Fracture or Deformity	Last Examination	Growth Arrest
R. L.	4	♂	Lower end of humerus	9/14/32	9/15/32	5/17/35	No
M. R.	4	♂	Distal humerus	10/22/31	11/ 5/31	4/ 4/32	Yes
E. C.	5	♂	Lower humerus	5/16/33	5/15/33	5/16/35	Yes
D. S.	5	♀	Distal humerus	12/26/30	12/27/30	1/28/31	?
L. G.	5	♂	Old, distal humerus	1915	1/16/31	4/ 8/31	Yes
R. H.	5	♂	Distal humerus	6/12/32	6/12/32	6/15/32	?
F. E.	8	♂	Distal humerus	7/ 6/31	8/ 6/31	5/16/35	Yes
A. B.	10	♂	T fracture lower end of humerus	8/ 4/32	8/ 4/32	5/15/35	Yes
D. Mc.	12	♂	Medial epicondyle, humerus	6/12/34	6/12/34	7/ 6/34	Too recent
J. S.	12	♂	Distal humerus	8/ 8/30	8/ 8/30	9/ 3/30	?
J. P.	13	♂	Distal humerus	10/15/30	11/26/30	5/23/35	Yes
M. H.	14	♀	Proximal humerus (postoperative infection)	2/17/31	2/17/31	4/16/34	Yes
T. D.	6	♂	Distal radius	8/15/32	8/25/32	9/29/32	?
D. A.	8	♂	Distal radius, old	July 1929	2/ 8/34	2/ 8/34	Yes
M. B.	8½	♀	Head of radius (open reduction)	7/ 2/34	7/16/34	5/17/35	Yes
H. B.	9	♀	Distal radius	10/ 3/32	10/ 3/32	11/ 7/32	?
S. C.	11	♀	Distal end of radius	9/ 1/31	9/21/31	10/31/31	?
J. B.	11	♂	Head of radius	Oct. 1933	3/10/34	3/10/34	Yes
J.H.	12	♂	Distal radius; comminuted, compound	7/24/33	11/23/33	4/18/35	Yes
J. R.	13	♂	Distal radius	7/ 4/32	7/ 4/32	7/26/32	?
P. W.	8	♀	Distal ulna	11/ 9/31	11/ 9/31	12/10/31	?
D. K.	13	♂	Distal ulna	5/10/35	5/10/35	5/11/35	Too recent
I. M.	7	♂	Lower femoral, old	1927	10/29/34	4/25/35	Yes
J. W.	9	♀	Distal femoral	12/11/33	12/11/33	5/17/35	Yes
H. R.	12	♂	Neck of femur with epiphyseal separation	12/28/34	12/28/34	2/18/35	Yes
T. K.	12	♀	Lower femoral	2/15/30	3/ 9/31	4/30/35	Yes
W. L.	13	♂	Lower femoral, old	1931	7/ 7/33	6/27/34	Yes
H. M.	13½	♀	Intracapsular, neck of femur	Oct. 1932	5/15/33	9/12/34	Yes
S. W.	9	♀	Medial malleolus	7/24/33	7/24/33	8/21/33	?
M. V.	10	♂	Distal tibia, compound, old	1928	3/21/32	3/21/32	Yes
W. M.	12	♂	Distal tibia, old	1932	1/ 6/34	5/16/35	Yes
M. L.	14	♀	Distal tibia; epiphyses almost closed at time of injury	12/21/30	12/21/30	11/ 8/34	Yes
R. W.	8	♂	Tibia and fibula at ankle, compound, old	8/12/31	10/19/31	10/27/31	Yes, both
A. M.	9	♂	Distal tibia and fibula	June 1932	6/27/32	8/18/32	?
K. S.	9	♀	Distal tibia and fibula	10/16/34	10/16/34	5/16/35	Yes, both
D. W.	12	♀	Distal tibia and fibula	10/28/34	10/31/34	5/16/35	Yes
J. G.	12	♂	Both malleoli	4/23/30	4/25/30	7/ 1/30	?

? denotes no recent follow up.

TABLE 3.—*Analysis of Cases in Table 2*

1. Total fractures of growth cartilages	42
2. Old fractures admitted because of deformity	8
3. Fractures complicated by infection (all had growth arrest)	5
4. Fresh uncomplicated fractures of the epiphyseal cartilages	33
5. Fractures in item 4 with roentgen follow up six months or more	19*
6. Growth arrests in group in item 5	18
7. Percentage of growth disturbances in the series with adequate follow up	95%
8. Ages:	
(*a*) Youngest	4
(*b*) Oldest	14
(*c*) Average	9½

* Two of the fractures were too recent to determine fate of the growth cartilage and ten patients (twelve fractures) had moved without leaving addresses or were otherwise lost.

Lewin [3] in 1929 published a comprehensive review of the growth, development, injuries and diseases of the epiphyses, but he did not discuss growth disturbance secondary to fractures that involved the epiphyseal cartilage.

Elmslie,[4] Reschke [5] and Speed [6] have reported cases of arrest of growth of long bones from simple fractures that extended across the cartilage plate. However, no analysis of a significant series of fracture cases to determine the incidence in which fractures in children have involved the growth cartilages or have resulted in growth disturbances has been reported.

TABLE 4.—*Location of Fractures of Epiphyses or Fractures of the Shaft That Crossed the Epiphyseal Line, in Children*

Humerus (1 proximal, 11 distal)	12
Radius (2 proximal, 6 distal)	8
Ulna (distal)	2
Femur (4 distal, 2 capital epiphysis)	6
Tibia (distal)	9
Fibula (distal)	5
Total	42

In this group of thirty-seven patients there were forty-two such fractures, an incidence of 14.4 per cent of all the fractures in children.

Table 2 includes all the patients 14 years of age or younger at the time the fracture occurred who have been seen in this clinic because of an old fracture of a long bone that resulted in growth arrest and

3. Lewin, Philip: Epiphyses: Their Growth, Development, Injuries and Diseases, Am. J. Dis. Child. **37:** 141-178 (Jan.) 1929.

4. Elmslie, R. C.: The Relationship of Fracture of the Lower Epiphysis of the Tibia to Arrest of Growth of the Bone, J. Orthop. Surg. **1:** 215-218 (April) 1919.

5. Reschke, Karl: Beobachtungen über erworbene Deformitäten durch Wachstumsstörungen infolge örtlicher Beeinflussung der Epiphysenknorpel, Deutshe Ztschr. f. Chir. **197:** 292-327, 1926.

6. Speed, J. S., and Macey, H. B.: Fractures of the Humeral Condyles in Children, J. Bone & Joint Surg. **15:** 903 (Oct.) 1933.

deformity or recent fractures that definitely included the growth cartilage.

An analysis of the cases that are listed in this table is given in table 3. The total number of fractures observed in children that involved the growth cartilage was found to be forty-two, which, as previously mentioned, is about 14 per cent of all the fractures of the

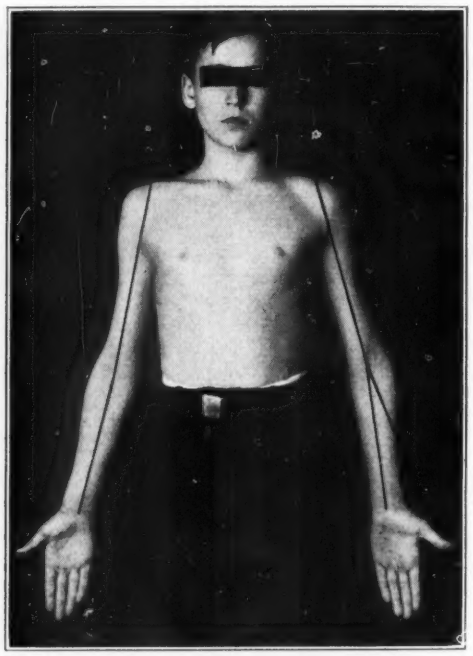

Fig. 1 (case 1).—Reversal of the carrying angle of the left arm, May 11, 1935, due to the retarded and finally arrested growth of the medial condyle of the humerus.

long bones in children which have come to this clinic. Of this number, eight were old fractures admitted because of deformity due to arrest of growth. Three of the eight had been compound fractures, so that the growth cartilage was injured by the infection as well as by trauma from the fracture. Of the entire group of forty-two fractures, five were complicated by infection, in all of which growth was arrested. There were thirty-three fractures in which the epiphyseal cartilage was involved but were too recent to show deformity at the time of the first admission. In only nineteen of these have we been able to secure an adequate roentgen follow-up examination. Of the nineteen, eighteen have shown definite growth arrest, an incidence of 95 per cent.

In table 4 the location of the various fractures that involved the growth cartilage are shown. The most common fracture to extend across the epiphyseal line into the epiphysis is that of the distal end of the humerus, while the bone that is least often injured in this way, as judged by this rather brief series of cases, is the ulna.

The following cases are illustrative of the growth disturbances that may result from fractures which include the growth cartilages:

REPORT OF CASES

CASE 1.—A. B., a boy, aged 10 years, sustained a fracture of the lower end of the left humerus, Aug. 6, 1932. Roentgenograms taken immediately after the injury showed a transverse supracondylar fracture and a split downward through the distal fragment across the epiphyseal cartilage into the joint. A satisfactory reduction was obtained. Following removal of the cast, the distal fragment angulated posteriorly. The patient recovered complete extension and flexion through an arc of 130 degrees. In January 1934, roentgen examination revealed loss of the normal carrying angle of the left elbow. This cubitus varus deformity has slowly increased, owing to normal growth of the radial half of the distal humeral epiphysis and retarded growth of the medial half. Roentgen examination May 11, 1935, showed fusion of the medial portion of the distal growth epiphysis to the lower end of the shaft of the humerus (fig. 1).

CASE 2.—D. A., a boy, aged 13 years, seen at the University of Chicago Clinics, Feb. 8, 1934, fell from a viaduct, July 19, 1929, and both arms were fractured at the wrist (fig. 2). Both fractures were reduced and union occurred. Normal function was restored in the right arm. Three years later the mother of the patient observed that the left arm was deformed at the wrist, with the hand deviating toward the radial side. A roentgenogram taken at this time showed fusion of the distal epiphysis to the metaphysis of the radius. Roentgenograms taken on admission to the University of Chicago Clinics (fig. 3) showed shortening of the shaft of the left radius, fusion of the distal radial epiphysis to the metaphysis and deformity with radial deviation of the hand, resulting from continued growth of the ulna. Arrest of growth of the ulna by excision of the distal end of the shaft was advised.

CASE 3.—J. W., a girl, aged 8 years, was struck by a truck, Dec. 11, 1933, and was brought into the hospital unconscious. The right knee was painful and swollen. A roentgen examination showed backward displacement of the lower epiphysis of the right femur of about 1 cm. and a simple fracture, without displacement, of the distal shaft, the cartilage plate and the epiphysis. The displacement of the epiphysis was reduced by extension traction, and a plaster cast was worn for five weeks. The patient recovered normal and painless function of the knee. She was last examined May 17, 1935, and at this time she walked without any limp and had normal function. A roentgen examination, May 16, 1935, showed narrowing of the epiphyseal line and fusion of the lateral condyle to the shaft. This injury to the cartilge may result in growth arrest of the lateral condyle of the femur. Continued growth of the medial condyle will thus produce a genu valgum deformity.

Fig. 2 (case 2).—Fracture dislocation of the distal epiphysis of the left radius, July 26, 1929.

CASE 4.—W. L., a boy, aged 15 years, admitted in July 1933, was struck by a car about two years prior to admission and sustained an injury to his right knee. Subsequently he developed a progressive right genu valgum deformity. Roentgenograms taken the day of admission showed unequal growth of the right lower femoral condyles, with the lateral shorter than the medial condyle (fig. 4). Interpretation of these roentgenograms and the history led to the impression that the patient had sustained an incomplete fracture of the lower end of the

femur similar to that described in case 3, with arrest of growth of the lateral condyle. Correction was by supracondylar osteotomy.

CASE 5.—I. M., a boy, aged 14 years, came to the University of Chicago Clinics because of a flexion deformity and 2 inches shortening of the right leg. Seven years before this admission he had fallen, sustaining a fracture of the lower end of the right femur with displacement of the femoral epiphysis (fig. 5).

Fig. 3 (case 2).—Appearance Feb. 8, 1934, five years after the fracture. There has been no further growth of the left radius from its distal epiphysis, and the growth of the ulna has increased the deformity of the wrist.

Roentgenograms showed that it was accurately reduced. Subsequently the epiphysis became fused posteriorly to the shaft of the femur. Growth continued from the anterior portion of the distal growth cartilage but was retarded in the posterior portion. As a result of this the condyles became gradually tilted backward, so that the proximal end of the tibia articulated with the femoral condyles in a posterior position and it was not possible for the patient to extend the leg more than 160 degrees. An operation for lengthening the femur, similar to the technic described by Putti, but with the addition of a full thickness tibial bone graft which would reinforce the femur in the region of the osteotomy, was performed Nov. 6, 1934. At this time an attempt was made to correct, at the site of the osteotomy, the posterior displacement of the lower femoral epiphysis. The operation was successfully performed and approximately 2 inches of length was obtained by fixed skeletal traction continued for four weeks. The patient is now walking and is able to extend this leg completely.

CASE 6.—K. S., a girl, aged 9 years, had growth arrest of the distal fibula and tibia. The patient fell while playing at school, Oct. 16, 1934. Roentgen examination showed a fracture of the lower end of the tibia and across the epiphyseal cartilage into the epiphysis. There was also a fracture through the epiphyseal line at the distal end of the fibula with about 3 mm. medial displacement of this epiphysis. Immobilization in a plaster cast was continued for one month. Weight bearing was permitted after six weeks. Restoration of normal function was accomplished, but roentgen examination, May 16, 1935, showed narrowing and irregularity through the line of the growth cartilage, with beginning fusion of the epiphysis to the shafts of both the fibula and the tibia.

CASE 7.—D. W., a girl, aged 12, sustained a simple fracture of the distal portion of the shaft of the left tibia and fibula, Oct. 28, 1934. The fracture included the epiphyseal cartilage of both bones. A roentgenogram April 13, 1935, revealed smooth articular surfaces and there was no deformity. The epiphyses of both the tibia and the fibula have fused to the metaphyses. Since this patient is physically more mature than her age would indicate, not more than 1 to 2 cm. of shortening of the leg is anticipated.

CASE 8.—W. M., a boy, aged 14 years, came to the University of Chicago Clinics, Jan. 6, 1934, because of a progressively increasing deformity of the right ankle. Two years before, he had sustained a fracture of the tibia. Roentgen examination at that time showed that the fracture line had crossed the epiphyseal cartilage and the epiphysis and entered the ankle joint at its medial side (fig. 6*A*). Roentgenograms which were taken at the time of his admission to the clinic showed an arrestment of the growth of the medial malleolus of the tibia (fig. 6*B*). The lateral two thirds of the lower end of the tibia had continued to grow and the astragalus had become rotated medially toward the defect produced by the arrest of growth of the medial malleolus. A transverse line across the shaft of the tibia about 1.5 cm. above the open epiphyseal line of the growing epiphysis and approximately directly continuous with the epiphyseal line of the growth arrested medial portion of the distal end of the tibia was interpreted as the site of the epiphyseal cartilage at the time of the injury and to have been produced by temporary arrestment of growth due to the fracture.

Jan. 29, 1934, an attempt was made to correct the varus deformity of the foot and to arthrodese the astragalus to the growing portion of the tibia. The deformity was corrected and the astragalus became fused to the growing portion of the epiphysis. The patient began to walk without crutches and without mechanical support for the foot, six months after the operation. Three months later he fell and sustained a spiral fracture of the tibia just above the distal epiphysis, but this time the fracture line did not cross the growth cartilage. The second fracture united and for the past seven months the patient has walked without discomfort and only a slight limp. The last roentgen examination was made May 16, 1935, and showed that the deformity had not recurred. The astragalus is now firmly united to the growing portion of the tibia, the right leg is

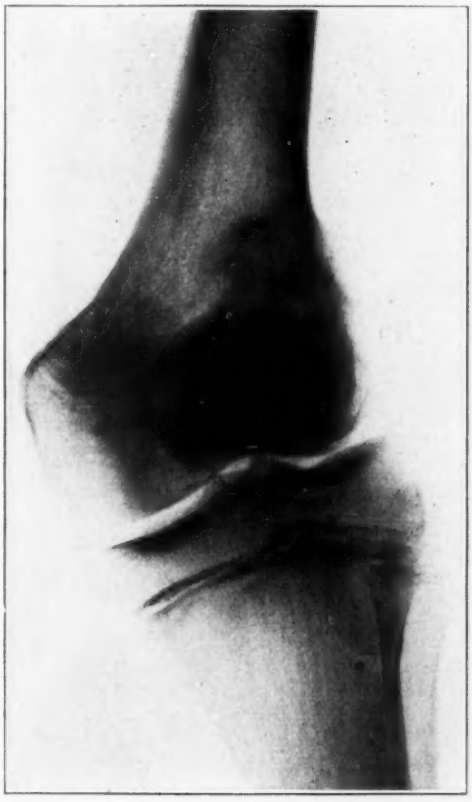

Fig. 4 (case 4).—Condition Aug. 29, 1933, two years after the injury, showing growth arrest of the lateral condyle of the femur with the development of a marked genu valgum deformity.

approximately 0.5 cm. shorter than the left, and there is no obvious disability (fig. 7). At his last visit in the clinics he requested permission to try for football at school next year.

CASE 9.—G. D., a boy, aged 16, with growth arrest from operative trauma, came to the University of Chicago Clinics in 1930, at the age of 11 years, because of a deformed left foot and short left leg. He had been born with a calcaneus deformity and was operated on at the age of 2 months, again at the age of 5 months, and a third time at the age of 8 months.

The exact nature of these operations could not be learned. The calcaneus position was not corrected, and after the operations the left leg grew more slowly than the right.

My examination revealed a marked deformity of the foot and an extreme calcaneus position (fig. 9*A*). The left leg, measuring from the anterior superior spine to the medial malleolus, was found to be 3½ inches longer than the right. A roentgenogram of the left foot revealed gross deformities consisting of absence of part of the talus, some of the midtarsal bones, and the distal epiphyses of the tibia and the fibula.

Fig. 5 (case 5).—Condition Oct. 31, 1934, showing angulation posteriorly of the distal end of the femur, due to growth arrest posteriorly while the growth cartilage in the anterior region has remained active. The epiphysis has now completely fused to the shaft of the femur, while the epiphyseal lines at the proximal end of the tibia and fibula are still open. As a result of this growth disturbance there is shortening of 2 inches in this femur, and extension of the knee is limited to 160 degrees.

The parents had been told by the surgeon who operated when the child was an infant that he had shortened the bones of the leg in order to correct the calcaneus deformity. Obviously he was ignorant of the importance of the growth epiphyses and had deliberately chopped them off or crushed them in an attempt to correct the deformity forcibly.

After a futile attempt to correct the calcaneus position by a turnbuckle brace, I performed a wedge resection through the remaining midtarsal bones and displaced the foot posteriorly under the astragalus. This operation made it possible for the patient to walk on the plantar surface of the foot. In addition to this, the growth epiphyses at the lower end of the right femur and proximal ends of the right tibia and fibula were fused to the shaft by the method that has been described by Phemister.[7] At the time of this operation, Jan. 29, 1932, the left leg was 3½ inches shorter than the right. Teleroentgenogram measurements were last made Feb. 14, 1934, two years and one month after arrest of the growth epiphyses at the right knee. These measurements showed that there had been a retardation of growth of the right leg so that the left leg had gained 2 inches. He now walks well, wears a standard oxford shoe, and has little functional disability (fig. 8*B*).

COMMENT

Textbooks have been notably lacking in warning of the dangers to the growth cartilage from fractures which include this portion of the long bone.

Reschke has reported a brief series of cases of growth disturbances that resulted from fractures of the ends of the long bones in growing children. Elmslie reported one case of a fracture with growth arrest of the distal end of the tibia, while Speed has discussed the growth deformities that result from fractures of the distal end of the humerus. Snyder reported growth arrest from unilateral surgical trauma to the epiphyseal cartilage plate of the long bones of children. For correction of the deformities he recommended unilateral arrest of the cartilage plate of the opposite side or the use of braces or casts, which would be worn until growth ceased.

Phemister has recommended growth arrest of epiphyses of the longer leg in cases of inequality of leg length in children. He has also successfully performed growth arrest of a more rapidly growing unilateral portion of one epiphysis to correct deformity. Growth arrest operations were performed in case 9, in which there was 3½ inches of shortening of one extremity due to surgical trauma to the distal end of the tibia and fibula when the patient was less than 1 year of age. This operation, which consisted of the arrest of growth of the distal epiphysis of the femur of the longer leg and the proximal epiphyses of the tibia and fibula, resulted in partial equalization of the length of the two legs.

I have not seen in a clinical case an example of the condition which Hans Selye[8] has described in rats. Selye has shown that, if the distal end of the femur is removed during the first few weeks of life in the rat, a new growth cartilage is formed and the growth in length is resumed. This new growth cartilage forms always in a plane at right angles to the shaft, irrespective of the plane of the amputation. In case 9 of the present series, the distal epiphyses of the tibia and fibula were excised when the patient was less than 1 year of

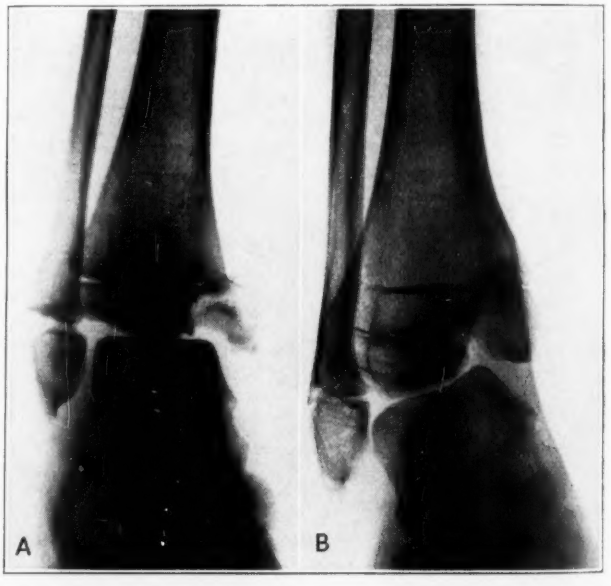

Fig. 6 (case 8).—*A*, injury of the medial portion of the distal epiphysis of the tibia, Sept. 23, 1931, which extends across the epiphyseal cartilage but cannot be seen to include the metaphysis; the epiphysis of the fibula has been dislocated medially. *B*, Jan. 6, 1934, two years after the fracture. The medial portion of the epiphysis has become fused to the metaphysis. There is a transverse line across the tibia, 1 cm. above the open epiphyseal line of the growing portion of the tibia, and this is directly continuous with the fused epiphyseal line in the medial portion of the tibia. This is attributed to the temporary cessation of longitudinal growth of this bone which immediately followed the injury.

7. Phemister, D. B.: Operative Arrestment of Longitudinal Growth of Bones in the Treatment of Deformities, J. Bone & Joint Surg. **15:** 1-15 (Jan.) 1933.

8. Selye, Hans: On the Mechanism Controlling the Growth in Length of the Long Bones, J. Anatomy **68:** 289-292 (April) 1934.

age. I was not able to secure interval roentgenograms but, when the patient was 11 years of age, at the time of his first visit to the clinic, there was no evidence of a growth cartilage that could be seen in the roentgenograms of the distal ends of these two bones. The shortening that had resulted was as much as would have been expected from complete absence of any growth from the distal epiphyses of the tibia and fibula.

Gillies [9] has shown that the characteristic fractures in the region of the wrist in childhood are either transverse or torus, the point of fracture being above the site of the classic radius fracture in adults. This has been found to be true in my own series and, since fractures of this type do not disturb the longitudinal growth of bone, it would seem to be a fortunate circumstance.

Fig. 7 (case 8).—The deformity noted in figure 6 *B* has been corrected. The astragalus is now firmly united to the growing portion of the distal epiphysis of the tibia. The distal epiphyses of both the right tibia and the right fibula have become fused to the shafts, while the epiphyseal lines of the left tibia and fibula are open.

Fractures of the epiphyseal cartilage of the long bones do not necessarily cause immediate arrest of growth. Growth disturbances may not be apparent six months or even a year after the fracture, but the epiphysis may be expected to fuse earlier than on the uninjured side. Instances of this have been noted in the present series. One year after the fracture in case 1 there was no evidence of a growth arrest, but three years afterward the epiphysis had fused, while the distal epiphyseal line of the uninjured humerus was still open. In case 3, six months after the fracture, a roentgenogram was taken which did not show a growth disturbance. One year and five months after the fracture had occurred, however, a roentgenogram showed definite fusion of the lateral condyle. In case 5 there was a deformity due to an early fusion of the posterior portion of the epiphysis of the femoral condyle, while growth continued anteriorly and resulted in tilting the condyles of the femur backward; but after two or three years of continued growth of the anterior portion this also fused, while the longitudinal growth continued in the normal leg and resulted in 2 inches of shortening of the femur in which the fracture had occurred. A somewhat similar condition was noted in case 8. Two years after the fracture had occurred, a roentgenogram showed complete growth arrest of the medial portion of the distal epiphysis of the tibia; but growth had continued at approximately a normal rate in the lateral two thirds. Since the fused epiphyseal line of this medial portion of the tibia was at the same level as a temporary growth arrest line which probably occurred as a result of the fracture, it is reasonable to assume that the arrest of growth of this more seriously damaged portion took place almost immediately after the fracture. At the time of the last roentgen examination, May 16, 1935, the portion of the epiphysis from which growth had continued had begun to fuse to the shaft and the line of the growth cartilage was being obliterated. A roentgenogram of the distal end of the tibia of the normal limb taken on the same date shows that the uninjured epiphyseal lines are open, thus indicating an early arrestment of growth as a result of the injury, although growth had continued in this portion of the tibia for more than two years after the fracture had occurred.

Birth fractures, or those which occur during infancy, are commonly of the transverse type and are shown by Truesdell [10] to be located in the midshaft region. None of the birth fractures reported by Truesdell included the end of a long bone. The youngest patient in the present series in which the fracture included growth cartilage was 4½ years of age. The average age was 9½ years. Since it has been shown that growth may continue for from one to three years after such an injury before the premature closure of the epiphyseal line occurs, in only a relatively small percentage of the cases in which growth is arrested by such fractures will there be an appreciable deformity. Those cases in which the fracture occurs after the age of 12 years, even though growth may be arrested, would be expected to result in a minimal degree of deformity.

Fig. 8 (case 9).—*A*, condition in 1932: The left leg is 3¼ inches shorter than the right because of trauma to the distal epiphysis of the tibia and fibula from an operation during infancy to correct a calcaneus deformity of the foot. *B*, condition in 1934, two years after operation for fusion of the distal epiphysis of the right femur and the proximal epiphyses of the right tibia and fibula. The difference in the length of the two legs is now 1½ inches.

9. Gillies, Carl L.: Fractures in the Region of the Wrist in Childhood, Puberty and Adolescence, J. Iowa M. Soc. **25**: 15 (Jan.) 1935.

10. Truesdell, E. D.: Birth Fractures and Epiphyseal Dislocations. New York, Paul B. Hoeber, 1917.

Truesdell has reported a series of cases in which there were dislocations of the cartilaginous epiphyses as a result of birth trauma. In some of these deformity, but no serious disturbance of growth, persisted throughout infancy. None of the cases reported had been followed until growth was complete. There was a striking tendency in these cases studied by Truesdell for the construction of new shafts of the long bones between the dislocated but invisible cartilaginous epiphysis and the epiphysis at the other end of the bone, so that for a time the roentgenograms showed a double shaft with subsequent absorption of the older bone.

CONCLUSIONS

1. About 35 per cent of all the fractures that have been treated in this clinic occurred in children 14 years of age or younger.

2. Fourteen per cent of the fractures in children involved the growth epiphysis.

3. Of the fractures in children that involved the growth cartilage and were seen before deformity had occurred and were followed for more than six months with roentgen examinations, eighteen of nineteen cases, or 95 per cent, showed growth disturbances.

4. Growth disturbance from fractures near the ends of the long bones in children are more common than is generally recognized.

5. The clinician should be reserved in his prognosis in the cases of such fractures and should follow these patients with periodic roentgen examinations for from one to two years after union of the fracture has taken place.

950 East Fifty-Ninth Street.

ABSTRACT OF DISCUSSION

DR. F. C. KIDNER, Detroit: Dr. Compere's statistical study of the harmful effect on growth of injury to the epiphyseal line of long bones focuses attention on a condition that surgeons rarely recognize. It first came under my observation in 1918 when I saw a girl of 17 whose left foot was in such extreme supination that she walked on the outer border of her foot, the external malleolus almost touching the ground. She injured her ankle ten years before. The deformity developed gradually. There was a sharp, inward angulation of the lower end of the tibia, so that its lower articular surface was at an angle of 45 degrees with the shaft. The fibula, which was much longer than the tibia, had grown like a bow around the ankle joint. It seemed probable that the original trauma had stopped the growth of the lower tibial epiphysis completely and that the deformity was the result of adaptive changes incident to the excessive growth of the fibula. Simple osteotomy of the inner border of the tibia and osteotomy of the fibula allowed correction. A recent case of a girl of 12 with almost no disability shows an extreme outward tilting of the astragalus apparently resulting from loss of growth of the outer half of the lower tibial epiphysis. The inner half and the epiphysis of the fibula have grown equally, so that the general alinement is good. The extreme tilt of the astragalus has been compensated by adaptive growth of the whole tarsus, so that the weight bearing and function are excellent. These and other experiences with deformities following epiphyseal fracture at the knee, elbow and ankle have been sufficiently common to lead me to warn the parents of children with such fractures that such deformities are possible. I have always felt that traumatic rupture of blood vessels with resultant poor circulation to a part or all of the epiphyses is the determining factor rather than actual injury to the cartilage cells. The best hope of prevention lies in accurate, gentle reduction of the fracture, followed by long periods of fixation and prolonged delay in weight bearing. My rule in epiphyseal fractures is not to allow weight bearing in less than three months.

DR. J. DEWEY BISGARD, Omaha: It has been known since the studies of Stephen Hale in 1747 that all growth in the length of long bones takes place by deposition of new bone at the diaphyseal extremities; also that this growth is unequal from the two ends of each long bone. The proportion of growth that takes place at each end has been calculated by Digby from measurements made from each end to the point at which the nutrient canal, when projected, intersects the center of the medullary canal. The accuracy of these calculations I was able to affirm experimentally. If growth is arrested at the end of a bone that contributes very little growth, little or no deformity from shortening results, whereas the converse is likewise true. Angulation and torsion deformities such as varus and valgus develop from asymmetrical growth arrest. Injuries and inflammatory lesions near the epiphyseal line often stimulate rather than retard growth and may cause deformity from overgrowth of an extremity. Overgrowth not infrequently prevents deformity by compensating for shortening of a bone in which a fracture has united with the fragments overriding. I wish to emphasize the importance of another type of injury which occasionally causes arrest deformity, and that is excessive roentgen and radium irradiation. The cells of the epiphyseal cartilage are moderately radiosensitive, so that therapeutic irradiation over or near the cartilage should be carried on with caution.

DR. EDWARD L. COMPERE, Chicago: It is fortunate that fractures in children are mostly of the shaft. In the University of Chicago Clinics 86 per cent of the fractures in children were of this type and did not reach the region of the growth cartilage. Of the 14 per cent that did cross the epiphyseal cartilage, eighteen of the nineteen cases did show arrested growth. Fortunately, most of these patients were approaching the limit of their growth period before growth was arrested, which accounts for the fact that not many of them developed marked deformities. Three per cent of all cases of fracture in children did have growth deformities that required correction. Truesdell, in his book on fractures and epiphyseal dislocations in the newborn, did not report a single instance in which the fracture involved the epiphyseal line. They were all midshaft fractures. As the patient grows older, the incidence of fractures that involve the epiphyseal line increases; but the danger of deformity is less, since the residual growth period is shorter. Deformity from growth arrest due to fracture, infection or surgical trauma is likely to be a late result, after the case has been discharged. Unless the surgeon is wise enough to continue to follow all cases treated for a lesion that involves an epiphyseal cartilage for several years or until their full growth has been attained, the patients may seek advice from other physicians when the deformity becomes apparent. When I was 11 years of age, I had osteomyelitis of the femur and was operated on by a doctor who didn't know about the epiphyseal line. The knife incision reached to the level of the knee joint on the inner side of the femur. As far as I can tell from subsequent roentgenograms the disease itself did not involve the epiphysis or the epiphyseal cartilage. Three years after the osteomyelitis had entirely healed the leg was straight and there was no evidence of growth deformity. About the age of 15, the leg began to be bowed. There was then no shortening that I could detect. The growth was first arrested on the medial side where the operation crossed the epiphyseal line, while it continued for a time on the lateral side. Subsequently it was arrested laterally also while the left leg continued to grow, so that I now have a shortening of 1 inch in addition to the outward bow of the femur. The injury to the growth cartilage led to premature closure of the epiphyseal line, but deformity was not observed until three years later. In cases of fracture or insult to the epiphyseal cartilage from any cause, patients should not be allowed to bear weight for several months and guarded prognosis should be made.

Precordial Pain.—The very first symptom of which a patient may complain when the myocardium begins to fail, and before the patient has reason to believe that his heart is not doing its work, is praecordial pain without hypertension.—Dr. Henry Mohler, quoted by Fisher, Alexander: Aphorisms in Clinical Medicine, *Canad. J. Med. & Surg.* **77**:166 (June) 1935.

HEALING OF THE NEWER BUMPER FRACTURES OF THE TIBIA

WALTER G. STERN, M.D.
AND
LOUIS E. PAPURT, M.D.
CLEVELAND

The popularity of the automobile as a locomotive agency has made it our greatest destructive force, and changes in design have immediately been reflected by changes in the type, character and relative frequency of the various resultant fractures. The great importance of the automotive factor in traumatic and fracture surgery is readily recognized when one realizes that in 1934 there were 1,250,000 nonfatal automobile accidents. This is 16⅔ per cent of all nonfatal accidents occurring in the United States.

In the early days the reverse Colles fracture, caused by the blow of the crank lever from the backfire of the motor, became commonplace. "Cowl" fractures of the patella are a recent innovation as a result of a change in body styling, while fractures of both rami of the lower jaw have become common since the use of nonshatterable glass in windshields.

In this presentation we are dealing with a new "bumper" fracture of the midthird of the tibia. This fracture of both bones of the leg is so characteristic that an automobile accident as the causative agent can often be deduced from the typical appearances on the roentgenogram alone. This, the newer type of bumper fracture is characterized by a severe comminution and splintering of the bone with many larger and smaller fragments, with long, linear fracture lines running up and down the tibia and, in the center of the comminution, a diamond or pyramid shaped fragment out of the cortex, usually on the anterior surface and often lying free from the rest of the fragments. The injury to the soft parts is usually severe and the fracture is often compound.

Fig. 1.—A typical bumper fracture. Note severe comminution, long linear fracture lines and diamond shaped fragment in center of comminution. Roentgenogram retouched.

Other types of injuries will, however, occasionally produce the same characteristic fractures. In reviewing the literature of fractures of both bones of the leg, we have carefully gone over the illustrations of the fractures presented and have occasionally found that injuries in mines from coal cars, falling rock and the like, produce similar fractures. One can readily see that the mechanism of this fracture-producing violence is rather similar to the direct violence of the bumper of an automobile.

Fig. 2.—Typical bumper fracture. Note loose pyramid shaped fragment from anterior cortex and comminution.

A few years ago Dr. N. A. Cary of Oakland, Calif., described a comminuted fracture of the head of the fibula and the external tuberosity of the tibia as a bumper fracture of the knee. An illustration in his paper depicts an automobile of the 1929 or earlier vintage. In the early days the bumper was placed much higher, but in the newer style, with low center of gravity motors, the bumper is placed low and usually has a ⌣ shaped curve in the center. In the most popular of these low priced cars the bottom of the bumper stands normally only 13 inches from the ground, and then when the speeding automobile is suddenly stopped the front end is thrust downward several inches more, thus carrying the point of impact still lower, till it is centered exactly at the middle of the tibia in the average man.

The reduction of bumper fractures of the tibia offers the same problems as other fractures of both bones of the leg except that the severe comminution usually makes the reduction more difficult, and a greater variety of methods other than simple extension or manipulations and casts, such as Kirschner wires, single or double pin technic, Boehler frames and the many other

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mechanical means which are rapidly appearing on the horizon, are gaining vogue. Although this paper deals primarily with the healing of these fractures, there are several points in the reduction and fixation which have a great bearing on the ultimate healing, to which we would direct attention:

1. *Excessive Manipulations to Obtain Anatomic Approximation.*—We have seen any number of bumper fractures in which there has been a satisfactory alinement but with only a mild overriding or displacement, necessitating from two to five manipulations to obtain complete approximation only to end in extremely delayed union. These repeated insults added to the original injury increase the local hyperemia with its decalcifying effects, exhausts the regeneration power of the bones, breaks up the early hematomas and fibrous framework of the future callus and is really putting too much of a strain on the reparative mechanism of the body to heal the fractures readily.

Fig. 3.—Old type bumper fracture of knee described by Dr. Cary in 1932.

2. *Overextension.*—Before the advent of skeletal traction and countertraction, overextension was little considered and seldom encountered. Most men felt that overextension could not occur and advised as much extension as could possibly be obtained by manual or mechanical means. Today, however, the advocates of the recent double pin traction, well leg traction or special wire traction apparatus almost universally warn against overextension.

3. *Inadequate Immobilization.*—There are two factors of inadequate immobilization: (1) incomplete immobilization and (2) immobilization for too short a period. Complete immoblization can best be secured by a well fitting plaster cast, pins being used when necessary.

I believe with many others that the standardized time of fixation universally given for the healing time of fractures is fallacious. A fracture should be immobilized until clinically and roentgenologically union has taken place or until all hope of union has been forsaken and reconstructive surgery is decided on.

It is our experience that in the severely comminuted fracture, such as the bumper fracture of the tibia, the usual period of immobilization is altogether too short; the healing time is more apt to be sixteen or more weeks than six. This does not necessarily mean a greatly prolonged period of nonuse with its resultant stiffness of joints, atrophy of muscles and tissues plus impaired circulation. It is this prolonged nonuse that has converted so many advocates to early massage, passive motion of joints and other forms of early manipulations that require splitting of casts, release of extension and interference with the proper immobilization. The advocates of early motion state that there is a right way to do this without causing motion in or displacing of the fragments, but how many surgeons or physical therapists are there on whom one can rely to do this? Such measures can only cause repeated traumatism to the early connective tissue, which is the framework of future callus, with recurring hyperemia of the part and promotion of decalcification of bones rather than calcification. Many authors state that slight motion within a fracture area promotes union. I believe this is unphysiologic and that union is obtained in spite of the motion. However, every orthopedic surgeon has seen fractures of long bones that have healed in the absence of all treatment, probably because the Lord is good.

Our experience leads us to agree with Watson Jones of Liverpool, that the greatest cause of nonunion in fractures of both bones of the leg is inadequate immobilization.

4. *Compound Fractures.*—Our stand for the conservative treatment of compound fractures has been frequently presented before this and other medical associations and in the literature. Our experience with bumper fractures with direct and often severe compounding has not altered this view. We have treated them conservatively by first cleansing the wound and temporary immobilization, and then delaying reduction and all manipulations until the time arrives—usually from five to eight days—when the danger of immediate infection is overcome. Our success has been uniformly good, as in other compound fractures, and union has always been obtained in these cases.

Fig. 4.—Bumper fracture. Union after five months. Mild overriding and lateral displacement. Excellent alinement; no disability.

The compounding of these fractures adds to the local hyperemia and inflammation and even if they are not infected they heal slower than simple fractures and therefore the rigid and active immobilization period to be described must necessarily be prolonged.

The most important purpose of this presentation is to emphasize the extreme slowness with which the bumper fracture unites. In our contacts with the various Cleveland hospitals and surgeons of northern Ohio, the story is always the same; these fractures are not healed after six to twelve weeks' immobilization no matter what method of treatment has been used. We encounter frequent instances of abandonment of fixation after ten to twelve weeks of immobilization with resultant deformity and nonunion already spoken of.

The literature fairly abounds in methods of reducing such fractures of the leg, but little is said about the prognosis of these fractures, the healing time or even as to what to do with them after the fracture is once reduced. Mention is sometimes made that fractures of the lower leg are slow to heal and that a convalescent brace is sometimes indicated; but the usual time of healing is given as from eight to ten weeks, whereas in our experience bumper fractures are infrequently united in this period of time. Our message is that bumper fractures of the leg are usually not united in less than sixteen weeks and often take much longer, and that the treatment should be planned with this in mind and should not be abandoned under one year, unless solid union has been obtained before this.

Fig. 5.—Typical bumper fracture. Overextension by double pin technic.

Our plan of treatment is as follows:

1. Primary reduction and fixation is carried out by the elected method for about eight weeks.

2. After eight weeks the cast, if applied, is removed and a plaster mold of the leg is made and measure taken for a walking brace reaching to the thigh, with lock joints at the knee.

3. The plaster cast with walking iron or walking heel is reapplied.

By this time usually sufficient fibrosis has taken place within the fracture area so that the leg is no longer flail and there is no longer a danger of slipping of fragments. If this is not the case, the cast without a walking splint is reapplied and the patient is compelled to use his crutches for from four to six weeks longer.

4. From the mold a model of the leg is made and a leather steel envelop brace with ring locks at the knee is constructed. This is form fitting and allows full weight bearing without any motion between fragments or any danger of angulation. The ordinary caliper brace is inefficient and does not completely immobilize the fragments.

By this weight bearing and active function the circulation of the extremity is improved, muscle tone is reestablished and bone production is stimulated. There is a gradual deposit of lime in the callus with increasing fixation of the fragments until solid union finally takes place.

The accompanying table shows the length of healing in bumper fractures actually treated by us. (We also have incomplete records of several hundred more treated at other hands in which the average healing time is about the same.

Length of Healing in Bumper Fractures

Time of Union in Months	Number of Cases	
	Closed	Compound
1	..	..
2	17	..
3	13	3
4	12	3
5	21	1
6	12	2
7	6	3
8	9	1
9	6	2
10	3	1
11	3	..
12	7	1
13	..	..
14	1	..
15	..	..

Average healing time, 6.2 months

SUMMARY

1. The new bumper fractures of both bones of the leg are characterized by a severe comminution of the tibia with long linear fracture lines and a free diamond or pyramid shaped fragment out of the cortex.

2. These fractures are extremely slow in healing. The average healing time in a series of more than 100 cases was 6.2 months.

3. The treatment must be persistent or nonunion will result.

4. A practical method is employed of maintaining fixation of the fracture while allowing functional activity of the extremity.

1304 Hanna Building.

ABSTRACT OF DISCUSSION

DR. WILLIAM E. GALLIE, Toronto: The views of the authors may be sound, but I cannot agree with them on this subject of the newer methods of treatment. One might say that they are advocating that we cling to the older and well tried methods and be slow to take up such new-fangled ideas as those advanced by Kirschner and Böhler. There is so much that is good, however, in these newer methods, that I am sure that we would leave ourselves open to the criticism that we are showing our age if we were to condemn them. I believe that the Kirschner wire method of applying traction is the most valuable improvement in the treatment of fractures. The suggestion that these newer methods of treatment are too dangerous to be taught to our students applies equally well to treatment by manipulation and plaster, and, as far as malunion and nonunion are concerned, I think that it is the experience of most of us that the majority of such patients, when ultimately sent to us for treatment, have been treated, according to the doctor's conception of it, by just the plan that Drs. Stern and Papurt have outlined. The fact of the matter is that in most medical schools and hospitals the treatment of fractures is badly taught, and we have only ourselves to blame that our students and interns get into trouble when confronted with difficult fractures. To test this out, I would suggest that when the next serious compound fracture of the leg turns up we request the intern to carry out the whole treatment, interfering only when the malpractice becomes too obvious. I fear that we shall not be pleased. This paper draws attention to the principles of treatment and clearly shows how failure to observe these principles leads to unfortunate results.

DR. PAUL B. MAGNUSON, Chicago: The principles of treatment have not changed much for centuries. The first article that I can find on the subject was written about 462 B. C., and fractures were treated then in the same way—by extension and counterextension. The method of application of course depends on what is required in the individual case and what one has to work with at the time. Individual methods have been discussed many times to the exclusion of principles that are involved. When there is end bearing between the fragments, any simple method of traction or countertraction that will maintain reduction should be used. But when there is no end bearing and the fragments are constantly displaced by the muscle pull, traction and countertraction must take the place of end bearing of the fragments and some method must be devised to maintain them in position. The method chosen must depend on the circumstances under which the fracture must be treated. All fractures below the knee heal slowly, especially those involving both bones of the leg, owing probably to the poor circulation and poor nutrition. If the fracture involves the upper end of the tibia, with a split into the joint, other methods of treatment must be considered, and in my experience bumper fractures are frequently complicated by such a split into the joint, which slightly misalines the joint. The object in these fractures is to obtain a good weight-bearing line, and sometimes too much dependence cannot be placed on what is shown in the roentgenogram. Frequently the fibula will heal promptly and the tibia will not—why, I do not know. With the increase in automobile accidents there has been a consequent increase in methods of treatment. Fractures nowadays come not alone to the man who is doing industrial surgery but to the man in general practice in rural districts, because that is where most automobile accidents occur. The man in general practice, therefore, is the one who sees the fracture first, and the first reduction is a matter of importance so far as the end result is concerned.

DR. H. EARLE CONWELL, Fairfield, Ala.: Fractures cannot be treated by one method in every instance. The treatment should be applicable to the fracture and not the fracture to the treatment. It has been customary in my clinic to classify all fractures, especially those of the leg, not only according to the bone injury but to the muscle and other soft structure damage as well. My associates and I classify our fractures as 1, 2 3 and 4 plus. Treatment is then carried out according to the individual classification. The fracture of the tibia, discussed by Drs. Stern and Papurt, is usually of a severe type and in our clinic would fall under the classification of a 3 plus or a 3.5 plus leg injury, in which there is a tremendous amount of damage to the soft structures with comminution of the bone, which may or may not be compound. This is the type of case in which skeletal traction by the Kirschner wire through the lower end of the tibia is definitely indicated. The patient should be hospitalized until some form of external fixation, preferably a plaster cast, can be applied. After the soft structures have healed sufficiently and this severe fracture has been reduced to a simple fracture, we apply our circular cast. Skeletal traction should always be removed as soon as possible and it is not always necessary that it be kept in the bone until firm union has taken place. I agree with the authors that there are dangers in skeletal fractures as in any other type of treatment, including the type of treatment that they have described. Fixation in the convalescent period of these fractures, as the authors have emphasized, is most important. The too early removal of fixation and too early weight bearing will frequently bring about angulation of the fragments and also delayed union in many cases. These cases are major problems and should not be handled by inefficient subordinates.

DR. LOUIS E. PAPURT, Cleveland: I don't think that Dr. Stern meant to imply that he does not use pins or pin traction apparatus. We have Dr. Anderson's splint in our hospital and also the Macmillan splint. There are times when pins or wires must be used in selective cases but not indiscriminately. We have used them all, but I don't think that they should be used as a routine. Bumper fractures are slow in healing. Treatment must be planned with that in mind and patients so informed. The treatment must be carried out until union results.

Clinical Notes, Suggestions and New Instruments

REVERSED COLLES FRACTURE

SUCCESSFUL REDUCTION BY CLOSED METHOD

JOHN G. RAYMER, M.D., NORWICH, CONN.

Reversed Colles fracture occurs with relative infrequency. Its treatment therefore becomes a matter of importance to all who deal with fractures. Textbooks offer brief if any discussion of the subject and do not prepare the practitioner for the many difficulties which may attend the management of this type of injury. Webb and Sheinfeld[1] recently reviewed the subject and in concluding stated that "no cases of successful reduction of the described fracture by the closed method have been reported in the literature" and that "the fracture is therefore considered irreducible and operative reduction is advisable."

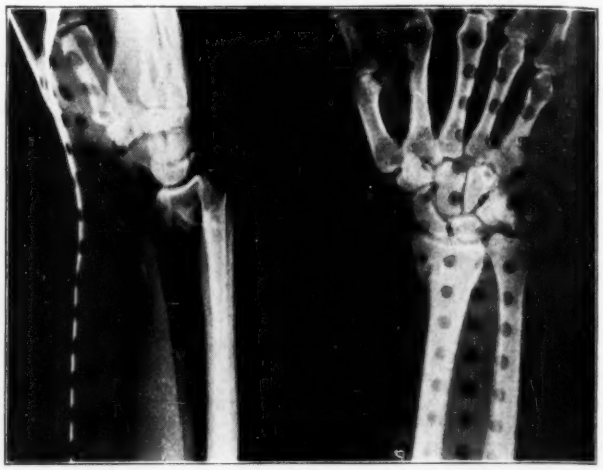

Fig. 1.—Before reduction, May 14, 1935.

Fig. 2.—On discharge, July 6, 1935.

In order to help remedy the unwarranted neglect shown reversed Colles fracture in the literature, and to stimulate discussion as to its treatment, the following report of a successful closed reduction is submitted:

REPORT OF CASE

P. P., a white woman, aged 38, seen May 14, 1935, within the past hour had fallen down a short flight of stairs and after being helped to arise had noticed at first only a numbness of her right wrist. On returning to work she noticed marked

1. Webb, George, and Sheinfeld, William: Reversed Colles Fractures, with Special Reference to Therapy, J. A. M. A. **104:** 2324-2326 (June 29) 1935.

deformity of the wrist, which was at once reported. After immobilization of the wrist, the patient was taken to the William W. Backus Hospital, where roentgen examination revealed a reversed Colles fracture of the right wrist (fig. 1).

Under general anesthesia the distal radial fragment was mobilized and by hyperflexion plus traction the fracture was reduced. Molded plaster splints were applied anteriorly and posteriorly with the hand in flexion, but the position was lost. Reduction was again secured, the splints being applied with the hand in a neutral position. This time the position, while improved, was unsatisfactory. A third reduction was made and the hand placed in an extended (cock-up) position and in adduction. Roentgen examination showed satisfactory position.

Ten days later the splints were temporarily removed and the skin given very light massage. At twenty days, position appearing perfect and with complete absence of pain, passive motion was started, followed at twenty-four days by guarded active motion. At thirty days a light posterior wood splint was applied over the fracture, and at thirty-four days only a bandage around the wrist was required. This was worn for one week, and finally a leather strap was used for ten days.

July 6, roentgen examination showed the position satisfactory and healing progressing nicely (fig. 2). Motion was excellent in all directions (estimated at 90 per cent), including supination. No pain was felt at the fracture site.

COMMENT

In this case the fracture line was situated sufficiently proximal to the joint so that effective manipulation and apposition of fragments could be secured and maintained. In determining the appropriate treatment for this type of fracture, the location of this line is an important deciding factor. The conclusion therefore is justified that certain cases of reversed Colles fracture can be reduced by the closed method and maintained throughout the necessary period of healing. It is suggested that the open reduction of such fractures be employed only when several attempts at closed reduction have failed.

40 Shetucket Street.

REVERSE COLLES FRACTURE—A PLEA FOR CLOSED REDUCTION

RALPH B. BETTMAN, M.D.
Associate Professor of Surgery, Rush Medical College
AND
WILLIAM J. TANNENBAUM, M.D.
CHICAGO

In the June 29 issue of THE JOURNAL, Webb and Sheinfeld[1] stated that reverse Colles fractures are not rare, that these fractures are difficult to reduce, and that open operation is indicated. The tendency to abandon the conservative methods of closed reduction in fractures for immediate open reduction is, we think, a dangerous one, as far as average practice is concerned, and therefore we dislike to see an entire group branded as requiring operation. This is especially true when we try to recall our own experience with this type of fracture.

During an active service in traumatic surgery in the war and a much less active one since, it seems to us that we have seen many patients who had a Colles fracture in which the distal fragment was displaced anterior instead of dorsal to the bones of the forearm. Furthermore, offhand it does not seem to us that we had much more trouble in the reduction of these fractures or that our treatment of them was much different from that used in the regular Colles fracture except that the hand was held straight or in more or less dorsal flexion, depending on the case. At the time Webb and Sheinfeld's article appeared, we had a patient with a reverse Colles fracture under treatment and it is this case which we report as an example of others we have seen in the past.

Miss H., aged 13 years, was thrown from a horse and in trying to break the fall stretched out her left arm. The impact came on the back of her hand just the reverse of the mechanism of the usual Colles fracture. We saw her an hour or so later and found the condition to be typical of that described by Webb and Sheinfeld as the reverse Colles fracture (fig. 1). Under a general anesthetic we reduced the fracture, controlled the reduction with a roentgenogram and placed the forearm and hand in a cast, the hand being slightly dorsiflexed, the reverse of the classic Colles reduction position. The cast was immediately split to allow for swelling. A week later the top

Fig. 1.—"This is a reversed Colles (fracture) in that the distal fragment is displaced toward the palmar rather than the dorsal surface of the wrist."
—Diagnosis of Dr. James Case.

of the cast was removed to lighten it; in two weeks the arm was removed for gentle massage and limited motion and then replaced in the anterior half of the cast. The anterior half of the cast was shortened bit by bit and after four weeks there was no more splinting at all except for a leather wrist strap. Now, three months later, the arm is in perfect condition, there is scarcely any deformity, the two wrists have to be studied together to be able to notice a difference, and the range of motion is practically full. The roentgenogram shows the excellent position of the fragment (fig. 2).

We report this case to emphasize that:

1. Reverse Colles fractures can be reduced and the reduction maintained without open operation.

2. We feel that an open operation is not indicated until after closed reduction has been tried.

Fig. 2.—Roentgenogram taken one month later. According to Dr. Case, the fragments are in good position and the callus is satisfactory.

3. In the reverse Colles fracture the classic position of flexion must be discarded and a straight position or a position of dorsiflexion adopted, as indicated by roentgenographic control of the position.

104 South Michigan Avenue.

1. Webb, George, and Sheinfeld, William: Reversed Colles Fracture with Special Reference to Therapy, J. A. M. A. **104:** 2324 (June 29) 1935.

Special Article

POLIOMYELITIS FOLLOWING VACCINATION AGAINST THIS DISEASE

J. P. LEAKE, M.D.
Medical Director, U. S. Public Health Service
WASHINGTON, D. C.

During the past year in the United States, several thousand individuals, mostly children, have received subcutaneous and intracutaneous injections of treated poliomyelitis virus in the hope of acquiring immunity against the natural disease. The two different forms of treatment to which the virus was subjected were intended to render it innocuous when thus used as a vaccine. Through those responsible for the production of these vaccines, through several health officers and through others, word has come to the United States Public Health Service of the development, at suggestive intervals following these injections, of cases of paralytic poliomyelitis with high fatality. Though possibly subject to some correction, it is believed that the following statements represent closely the facts in each case:

1. A boy, aged 5 years, had his first symptoms of poliomyelitis six days after receiving the second dose of vaccine A in the left arm, the first dose having been given in the same arm twenty-seven days before the second. Paralysis began in the left arm the day after onset and death occurred after an illness of three days.

2. A girl, aged 21 months, received the second dose of vaccine A in the right arm twelve days after the first dose, and the onset of poliomyelitis occurred six days after the second dose. Paralysis began in the right arm three days later and death occurred five days after the onset.

3. A boy, aged 4 years, had his onset of poliomyelitis eight days after the first dose of vaccine A in the left buttock, and one day after the second dose at the same site. Paralysis began in his right leg two days later and is at present, after three months, confined to that extremity, though there is hope of ultimate nearly complete recovery.

4. A girl, aged 8 years, had her onset of poliomyelitis eight days after the first dose of vaccine A in the left arm, and one day after the second dose in the same arm. Paralysis began in the arm two days later, and death occurred after an illness of three days.

5. A boy, aged 8 years, had his onset of poliomyelitis eight days after the first and only dose of vaccine A in the left arm. Paralysis began in the right arm two days later and remained as a deltoid paralysis at last accounts.

6. A boy, aged 5 years, had his onset of poliomyelitis nine days after the first and two days after the second dose of vaccine A in the arm. Arm paralysis began two days later, and death occurred after an illness of three days.

7. A boy, aged 10 years, had his onset of poliomyelitis ten days after the first dose of vaccine A in the left arm and three days after the second dose in the same arm. Paralysis began in the right arm the next day, and death occurred after an illness of three days.

8. A girl, aged 5 years, had her onset of poliomyelitis eleven days after the first dose of vaccine A in the right arm, and four days after the second dose in the left arm. Paralysis began in the left arm four days later and was still present at last accounts.

9. A boy, aged 15 months, had his onset of poliomyelitis thirteen days after a dose of vaccine B, and developed general weakness four days later, which persisted at the last report.

10. A boy, aged 5 months, had his onset of poliomyelitis fourteen days after a dose of vaccine B and paralysis was first noticed nine days later. This paralysis persists at the last report.

11. A girl, aged 6 years, had her onset of poliomyelitis fourteen days after the first, and seven days after the second, dose of vaccine A in the arm. Paralysis began in the left arm three days later, and complete recovery was questionable at the last report.

12. A youth, aged 20 years, had his onset of poliomyelitis fourteen days after the first and only dose of vaccine B in the arm. Paralysis began in the arm two days later, and death occurred after an illness of four days. From this case poliomyelitis was transmitted to monkeys by Dr. Kessel.

Paralytic poliomyelitis was not epidemic in any of the localities at the time of the occurrence of these cases if these cases themselves are not included in the count. Where the heaviest general incidence of poliomyelitis was reported, the expectation of paralytic poliomyelitis among those vaccinated within three weeks following vaccination, judging by its occurrence in the community at large by age groups, was one tenth of its actual occurrence. In all the other localities the ratio of expected occurrence among the vaccinated to actual occurrence was much less. If the likelihood of the whole series of cases having occurred through natural causes can be expressed by the product of these ratios, such chance occurrence is practically out of the question. In none of the cases was exposure to infection outside its own area known to be of special significance.

It is believed that to many physicians this series of cases, following by intervals of from six to fourteen days the injection of one or the other of two different vaccines, renders undesirable the further use of poliomyelitis virus for human vaccination at present.

In every case in which the sequence is known, the level of the spinal cord first affected corresponded to the extremity in which the injection was made, paralysis beginning either in the same limb or in the contralateral limb. This is strong support to other evidence that the virus of poliomyelitis is transmitted along nerve fibers, since neither blood nor lymph streams would afford direct access from one extremity to the corresponding cord level. The remarkably high fatality in this series of cases was perhaps due to the part of the cord primarily infected being close to the nuclei corresponding to the muscles of respiration. The possibility is to be considered that a strain of poliomyelitis that has been subjected to prolonged monkey passage, with rather short incubation periods, is unusually virulent to man when administered by the subcutaneous or intracutaneous route. Though in a few of these cases it is possible or even probable that there was another intercurrent illness in addition to poliomyelitis, in general the preparalytic symptoms were such as would be expected in poliomyelitis naturally acquired.

In forming a judgment as to the applicability of a poliomyelitis vaccine, the most inconsiderable local and general reactions following its use need to be taken into account.[1] It is also noteworthy that the appearance of neutralizing antibodies in the blood after the injection of poliomyelitis virus is very uncertain evidence of parallel immunity to the natural disease.[2]

Although any one of these cases may have been entirely unconnected with the vaccine, the implication of the series as a whole is clear.

1. Gilliam, A. G., and Onstott, R. H.: Results of Field Studies with Poliomyelitis Vaccine, read before the Southern Branch, American Public Health Association, St. Louis, Nov. 19, 1935, Am. J. Pub. Health, to be published.

2. See also Schultz, E. W., and Gebhardt, L. P.: On the Problem of Immunization against Poliomyelitis, California & West. Med. **43**: 112 (Aug.) 1935.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING ARTICLE. H. A. CARTER, Secretary.

RADIOTHERAPY

(ROENTGEN RAYS; RADIUM)

ARTHUR U. DESJARDINS, M.D.

ROCHESTER, MINN.

(Concluded from page 2071)

Mode of Action.—The rate of resolution of acute inflammatory lesions after irradiation corresponds to the rate at which normal leukocytes, notably the lymphocytes and polymorphonuclear cells, are known to be influenced by exposure to roentgen rays or radium. Moreover, the fact that a single, small dose usually suffices to induce resolution of acute inflammation also suggests that the main factor in the action of the rays on such lesions consists in destruction of infiltrating leukocytes. A considerable body of experimental and clinical evidence supports this view. Variation in the degree of leukocytic infiltration in different inflammatory processes may well account for differences in the effectiveness of irradiation at different stages. Destruction of leukocytes infiltrating an acute inflammatory lesion might, on superficial consideration, be regarded as necessarily deleterious. Prolonged experience, however, has failed to yield the slightest evidence of harmful effect, except when excessively large doses of rays have been used. On the whole, it seems most likely that destruction of infiltrating leukocytes liberates the antibodies and other protective substances previously elaborated within the cells and thus makes these substances more readily available for defensive purposes than when they were in the intact cells.

Chronic.—Chronic inflammations of different kinds also are amenable to radiotherapy. Tuberculous adenitis and peritonitis, actinomycosis and blastomycosis may be mentioned as examples. In dealing with chronic inflammation, single small doses of radium or roentgen rays no longer suffice. The dose must be larger than in the case of acute inflammation, although distinctly smaller than the maximal dose required in the treatment of tumors. Whereas in acute inflammations the dose may vary between 25 and 50 per cent of the limit of tolerance of the skin, in chronic inflammations the most effective dose varies between 50 and 80 per cent of the limit of tolerance of the skin. Still more important, however, cure or maximal benefit requires that irradiation be repeated a number of times at intervals of three or four weeks; smaller doses may be repeated at shorter intervals. Complete resolution of chronic inflammatory conditions is slow and can be obtained only by repeated treatment. This is especially true of tuberculous processes, in which the most effective treatment seems to be periodic exposure of the affected region to roentgen rays, combined with exposure of the entire body to gradually increasing doses of ultraviolet rays.

Mode of Action: The effect of radiotherapy in chronic inflammations appears to depend mainly on two factors: on the one hand, the degree of leukocytic infiltration, and, on the other, the proportion of connective tissue and of degenerative products such as caseous material and calcium. The relative proportion of these two factors seems largely to account for variation in the time required to bring such lesions under control.

Miscellaneous Conditions.—Hyperplasia of the Thymus Gland: Hyperplastic increase in the size of the thymus gland is not uncommon among children. This may be associated with cough, dyspnea and stridor, but the coincidence of such symptoms and thymic hyperplasia does not mean that the symptoms are the result of an increase in size of the gland. In many if not in most cases the respiratory symptoms and the enlargement of the thymus probably result from some nutritional or toxic disturbance. If the cause of the disturbance can be found and eliminated, the symptoms promptly disappear. If the etiologic factors cannot be discovered, treatment with roentgen rays provides a most satisfactory means of reducing the volume of the enlarged thymus gland, and this is often accompanied by relief from respiratory symptoms. A single exposure to a moderate dose of roentgen rays may be counted on to induce rapid shrinkage of the hyperplastic gland, but if subsequent regeneration and the possibility of renewed enlargement are to be prevented, the region of the thymus should be irradiated two or three times at intervals of two or three weeks.

Hyperthyroidism: There can be no doubt that cure or substantial improvement can be obtained by radiotherapy in a certain proportion of cases, but a larger proportion of patients can be cured with greater certainty by expert medical and surgical treatment. In other words, radiotherapy for hyperthyroidism is attended by a greater measure of uncertainty than skilled medical and surgical treatment. If the symptoms are not severe and the urgency of therapeutic measures is not too great, roentgen irradiation may be tried. Such a trial involves repeated exposure of the thyroid (and thymic) regions within three or four months. Should such a trial fail to result in complete relief, further radiotherapy should be given up. Regardless of the method of treatment, systematic and careful study of all clinical and metabolic features should be made by a qualified physician.

Leukemia: In acute leukemia, exposure to roentgen rays or radium is seldom followed by perceptible improvement, and experienced radiologists usually do not encourage such treatment. In the subacute form cautious treatment, and in the chronic form thorough treatment, yield more or less marked improvement for periods varying from months to several years. Usually the treatment must be repeated from time to time, depending on the numerical behavior of the leukocytes and on the tendency of the spleen or lymph nodes to enlarge. Effective treatment can be given with roentgen rays or radium. At the outset, and when extensive areas require irradiation, roentgen rays are preferable.

In myeloid leukemia the rays are directed first to the spleen, and then, if this is not sufficient to reduce the number of leukocytes approximately to the normal level, the mediastinum and long bones also may be irradiated. When the spleen is large, the surface of the abdomen corresponding to that organ may be divided into a number of fields, approximately 10 cm. square, and each field should be exposed to a moderate dose of roentgen rays. If radium is used to irradiate the enlarged spleen, a large pack is required. The effect of treatment on the leukocytes should be followed closely by daily or frequent blood counts. When the number of leukocytes diminishes rapidly, the number of fields irradiated each day should be correspondingly

reduced; otherwise, an excessive leukopenia may result. An abnormally small number of erythrocytes at the outset need not be regarded as a contraindication; under treatment the number of these cells tends to increase as the number of leukocytes diminishes. After a patient has been treated a number of times at intervals of months, the effectiveness of treatment tends to diminish; but this varies considerably from patient to patient. If the patient cooperates faithfully, the disease may often be kept under control for prolonged periods, sometimes for many years.

In lymphoid leukemia the treatment is directed first to the main groups of lymph nodes in the neck, axillae and groins, as well as to the mediastinal and retroperitoneal lymph nodes. If, by the time these several regions have been irradiated, the number of leukocytes has not diminished sufficiently, additional treatment to the shaft of the major long bones may have to be given.

The action of roentgen rays on leukemic hyperplasia of the spleen, lymph nodes and other structures, including the skin, is to destroy leukocytes (chiefly lymphocytes and polynuclear cells) or to cause such cells to pass through their life cycle so rapidly as to constitute virtual destruction. Leukemic infiltrations of the skin, with or without pruritus, generally subside as the number of leukocytes decreases and as the other clinical manifestations improve. After a time, which varies from patient to patient and which apparently depends on the relative acuteness or chronicity of the disease, radiotherapy may become less effective. Usually this means that the disease is approaching its terminal phase. This phase may be accompanied by a tendency to hemorrhage or by increasing weakness and death, sometimes without fresh hyperplasia of the spleen or lymphoid structures.

Hodgkin's Disease; Lymphogranulomatosis; Lymphoblastoma. — (See Tumors Derived from Lymphoid Cells.)

Benign Tumors.—Giant-Cell Tumor of Bone: There is evidence that, in most cases, the giant-cell tumor of bone is a chronic inflammatory process and is therefore essentially benign. The reaction of such tumors often differs from that of malignant processes in general. After irradiation, all malignant tumors retrogress to different degrees or do not undergo any perceptible change. Two or three weeks after irradiation, in many cases, a giant-cell tumor begins to swell, and the swelling is accompanied by redness, pain and tenderness. To the patient as well as to the uninitiated physician such manifestations may give the impression that irradiation has increased the activity of the tumor, and a hasty amputation may be undertaken. If not disturbed, this swelling, redness and pain begin to subside after a week or ten days and may gradually disappear. New bone is slowly deposited in the tumor, which, in the course of time, is replaced by solid bone.

Fibromyoma Uteri: In the absence of contraindications, radiotherapy is an excellent method of treatment because it avoids operation with its attendant hospitalization, disability and possible mortality, which, though small when the operation is performed by an experienced surgeon, can hardly be called negligible. Roentgen rays act primarily on the ovaries and abolish menstrual function in from three to eight weeks. This is followed by cessation of bleeding and a gradual regression of the uterine tumors, with corresponding relief from pain, discomfort and other symptoms. But one course of treatment, consisting of two or three daily exposures to roentgen rays of short wavelength, is sufficient in all but a small proportion of cases, in which the treatment may have to be repeated once after an interval of three months. If the treatment is given within one week after a menstrual period, menstruation is not likely to recur. If given later, the patient may menstruate once or even twice more, and the menstrual bleeding may be more abundant than usual but will then cease permanently. Roentgen rays are preferable to the intra-uterine use of radium, except when the fibromyomas are definitely submucous.

Classification of Tumors from Standpoint of Radiosensitiveness

Radiosensitive Tumors

Group 1	Lymphoblastoma { Lymphosarcoma; Hodgkin's disease }
	Lympho-epithelioma
	Diffuse endothelioma (Ewing), or endothelial myeloma (Kolodny) of bone
Group 2	Embryonal carcinoma (seminoma of testis) (spermatogonial cells)
	Embryonal carcinoma of ovary (follicular epithelium)
	Embryonal carcinoma of kidney (Wilms tumor)
Group 3	Giant cell tumor of bone
	Multiple myeloma of bone
	Basal cell epithelioma
	Transitional cell epithelioma
	Mucinous carcinoma of intestinal tract (mucous-secreting epithelial cells)
	Hemangioma
	Hemangio-endothelioma

Moderately Radiosensitive Tumors

Group 1	Carcinoma of uterine cervix
	Carcinoma (not adenocarcinoma) of thyroid gland
Group 2	Epithelioma of tonsil and pharynx
	Carcinoma of breast
	Epithelioma of bronchus
	Epithelioma of lip and eyelids
	Epithelioma of mouth and tongue
	Epithelioma (squamous cell) of skin
	Carcinoma of rectum
	Chondrosarcoma of bone

Radioresistant Tumors

Fibromyoma (uterus), direct irradiation
Fibrosarcoma
Carcinoma of esophagus and stomach
Adenocarcinoma anywhere, with possible exception of uterus (cervix or fundus) and thyroid gland
Mixed tumor of parotid gland
Hypernephroma
Sarcoma of bone, osteogenic
Melanoblastoma and nonmelanotic melanoblastoma of skin
True teratoma
Neurofibroma
Fibroma
Chondroma
Lipoma
Myxoma
Myxosarcoma

The amenorrhea resulting from radiotherapy is exactly the same as that of the natural menopause, except that it comes on more rapidly. Its subsequent course is identical to the natural process, all legends to the contrary notwithstanding. The size of the tumor or of the tumefied uterus per se is not a contraindication for radiotherapy. On the contrary, excessive bleeding with anemia demanding urgent relief, the wish to avoid amenorrhea by a woman who still may have and desires children, the presence of pedunculated or calcified fibromyomas, and an incarcerated uterus require surgical operation in preference to radiotherapy. The transformation of fibromyoma into sarcoma or carcinoma by irradiation has never been established. It is probable that, in the cases reported, the uterine tumor was a sarcoma or carcinoma from the start.

Malignant Tumors. — General Considerations: The radiosensitiveness of tumors corresponds closely to the sensitiveness of the cells of which they are chiefly composed. This fundamental law enables the experienced radiologist to utilize irradiation not only to treat but sometimes to distinguish certain neoplasms from others.

Naturally, the diagnostic value of such a therapeutic test is greatest in neoplasms derived from the more sensitive varieties of cell; the information thus derived may sometimes be as valuable as the microscopic observations of the pathologist. From the standpoint of radiosensitiveness, tumors may be classified as in the accompanying tabulation.

Such knowledge has made it possible to differentiate certain varieties of tumors, such as lympho-epithelioma and Ewing's endothelial myeloma of bone, from other neoplasms with which they had previously been confounded. In tumors of the mediastinum, for example, roentgen irradiation almost always permits one to establish in a short time a clear distinction between a lymphoid tumor and an aneurysm. Moreover, when the reaction of roentgen rays is correlated with the clinical features, the usefulness of the therapeutic test may be considerably extended.

The most important effect of irradiation is to destroy those cells in a tumor which are most radiosensitive. In malignant processes characterized largely or wholly by lymphoid hyperplasia, the regression of hyperplastically enlarged lymph nodes is quite rapid; in other varieties of tumor, regression may be slow and less pronounced, whereas, in tumors composed of cells that are not sensitive to irradiation, perceptible regression may not occur even after large doses. Besides the direct destruction of cells, however, certain other factors play a part in the effect of radiotherapy on malignant growths. The cells which are destroyed by irradiation are replaced by connective tissue, and this has given rise to the notion that roentgen rays "stimulate" the formation of connective tissue. If the dose of rays exceeds the tolerance of the connective tissue cells present in a tumor, a proportion of these cells degenerate, and this leads to further increase in connective tissue. The action of the rays on the blood vessels of a tumor, with thickening or obliteration of the vessels and resulting diminution in the blood supply of the growth, also plays an important part in the effect of irradiation.

The impression that exposure of a tumor to roentgen rays may cause it to grow more rapidly arises from a misconception. After a period of relative quiescence or complete arrest following one or more courses of radium or roentgen treatment, the tumor tends to recover its original rate of growth. For a time it may actually grow more rapidly than before. This, however, is exceptional and is only a transient phase of the process. In many tumors, on the contrary, subsequent growth tends to be slower than before irradiation. Moreover, many new growths do not develop at a uniform rate, without reference to irradiation. If such a tumor should have passed from a phase of relative quiescence into a phase of greater activity, and if it should recently have been exposed to roentgen rays, the inexperienced observer might draw the erroneous conclusion that the increased activity was due to the action of the rays. The extensive experience of the most competent observers indicates that exposure of a tumor to roentgen rays or radium either causes inhibition of growth or remains without effect.

Tumors Derived from Lymphoid Cells (Hodgkin's Disease, Lymphogranulomatosis, Lymphosarcoma, Lymphoblastoma).—During recent years, pathologists have tended to regard these diseases as phases of the same condition and to designate them by the collective term "lymphoblastoma." Strictly speaking the suffix "oma" indicates a tumor, and it can literally apply only to lymphosarcoma; the fatal tendency of both conditions, however, has led many to consider them essentially neoplastic in character. Substantial evidence exists that the immediate cause of Hodgkin's disease and lymphosarcoma is long-continued infection of any kind. From a clinical point of view, and sometimes from a pathologic point of view also, the two conditions affect the lymphoid structures in much the same way, and often a purely clinical distinction cannot be made. Lymphosarcoma tends to metastasize more widely than Hodgkin's disease, but this is not often evident before death or, at least, before the late stages of the process. An important reason for considering the two conditions at the same time is that their treatment and their reaction to treatment are essentially identical.

In some cases the disease first manifests itself in the cervical lymph nodes and thence extends to the mediastinal, axillary and other nodes. In other cases the condition originates in the abdominal nodes and extends to the inguinal, mediastinal and other nodes. A few cases are encountered in which the disease primarily affects the stomach or the intestine. Bones may become involved either by pressure from adjacent hyperplastic lymph nodes or by invasion of the bone marrow. Nearly always, the nodes in which the disease first manifests itself are in anatomic relation to a region in which chronic infection has been present.

Tumors of this kind are exceptionally radiosensitive and retrogress rapidly under treatment. Many radiologists irradiate only regions in which enlarged lymph nodes are obvious. Usually it is preferable to give the patient from two to four courses of partial or general irradiation directed to the main lymphoid regions: the neck, axillae, groins, and mediastinal and retroperitoneal spaces. Irradiation of the ovaries of women less than 40 years of age should be avoided as much as possible. For general irradiation, a moderate dose of rays of medium wavelength usually yields the best results if all factors of the situation are taken into account. The condition and reaction of the blood (cellular elements) should be closely watched.

The immediate results of radiotherapy are often little short of miraculous. Patients with marked dyspnea, cough and obstructive engorgement of superficial veins may derive remarkable benefit in a few days. If treated thoroughly but carefully, the lymphadenopathy should largely or completely disappear in many cases, and meticulous periodic examination and occasional treatment as fresh hyperplasia of the lymph nodes occurs may enable the patient to remain well for months or, indeed, for several years. In a small proportion of cases lymphosarcoma reacts even more promptly than Hodgkin's disease, but in the average case the difference is hardly sufficient to constitute a distinctive feature. In lymphosarcoma, even metastatic infiltration within the skull and its associated symptoms may be made to disappear. Unfortunately, such metastasis indicates advanced disease, and improvement in the cerebral condition may soon be followed by fatal complications in some other part of the body.

Lympho-Epithelioma.—Tumors of this kind usually arise around the nasopharynx, but they sometimes arise in other parts of the body also. They present a general microscopic appearance of epithelioma and are regarded as such by most pathologists, but their possible lymphoid origin and essential nature are shown by the fact that they are much more radiosensitive than

ordinary epithelial neoplasms. Growths of this kind often undergo marked and rapid regression after thorough treatment, and permanent cure has been recorded in some cases.

Tumors of the Testis.—The term "teratoma," so commonly used to designate all tumors of the testis, is unfortunate because it tends to create confusion. While it may be true, as Ewing contends, that all these tumors are teratomas with one-sided development, it would seem desirable, from clinical and therapeutic points of view, to distinguish these varieties of testicular neoplasm from the true teratoma, which is relatively benign. The most common tumor of the testis, occurring in from 65 to 70 per cent of cases, is the embryonal carcinoma, derived from the basal or spermatogonial epithelium of the seminal tubules. It is often mistaken for sarcoma. Another, less common, neoplasm of the testis is the mixed, or teratoid, tumor, which represents from 25 to 30 per cent of all tumors of this organ. Derived from all three embryonic layers, it is composed of a rather indiscriminate mixture of embryonal tissues and, therefore, has a heterogeneous appearance. The true teratoma and a few other rare neoplasms make up the remainder of the tumors that affect the testis.

In the embryonal carcinoma, or in the mixed or teratoid tumor, metastasis usually first affects the para-aortic lymph nodes in the region of the celiac axis, where it may be confined for a long time. Later, sometimes much later, metastatic elements may extend through the thoracic duct to the sentinel nodes in the left supraclavicular space, to the mediastinum, and still later to the lungs, brain and other parts of the body. When metastasis to the retroperitoneal nodes has not occurred, orchidectomy may yield a permanent cure in a small percentage of cases; the difficulty of being certain about metastasis probably accounts for the large proportion of surgical failures. Metastasis to the para-aortic nodes occurs much earlier than is generally suspected. Even when such metastasis is not apparent, removal of the affected testis should be followed as soon as possible by thorough irradiation of the entire abdomen (from front and back and from both sides), and this procedure should be repeated once or twice at suitable intervals. Better still, however, orchidectomy should be preceded by one or two thorough courses of roentgen irradiation directed to the primary tumor as well as to the abdomen, and an interval of about six weeks should be allowed to intervene between irradiation and operation. When metastasis has already occurred, surgical removal of the primary growth is of no avail; but it may sometimes be advisable to relieve pain caused by the dragging weight of a bulky tumor.

In cases of embryonal carcinoma, well planned treatment with roentgen rays induces marked and rapid regression of the primary growth as well as of its metastatic deposits. The regression of mixed, or teratoid, tumors varies; sometimes it is rapid and pronounced, the growth sometimes practically disappearing, and sometimes it is slower and only partial. The rapidity and degree of regression of such growths apparently depend on the proportion of spermatogonial epithelium entering into their composition. The greater the proportion of such radiosensitive epithelium, the more rapid and the more complete the regression. Unfortunately, few neoplasms of this kind disappear completely and permanently, but complete and sometimes permanent regression of an embryonal carcinoma is not so rare. In the latter variety a complete cure may result from thorough treatment before metastasis has extended beyond the para-aortic nodes. But even though, in the majority of cases, more or less extensive metastasis may prevent permanent cure, adequate treatment may often lead to marked and prolonged improvement.

Tumors of the Ovary.—Of the tumors that affect the ovary, the colloid carcinoma is perhaps the most radiosensitive; but none of them respond so rapidly or so favorably to roentgen rays as do epithelial tumors of the testis. Nevertheless, many patients derive sufficient benefit to make treatment worth while. Radiotherapy is not a substitute for surgery in operable cases but may be used before or after operation, or both, to prevent or delay recurrence and metastasis. When operation cannot be considered, thorough irradiation of the pelvis and abdomen may often result in substantial, temporary improvement.

Tumors of the Nose, Nasopharynx and Pharynx.—Moderate irradiation with radium or roentgen rays may sometimes usefully supplement other measures or may make such measures unnecessary. If the quantity of radium available is not sufficient for effective external irradiation, roentgen treatment is preferable because it avoids the unpleasantness or discomfort of intra-oral application of radium.

Some tumors of the nose, nasopharynx or pharynx, such as lymphosarcoma, lympho-epithelioma and those of Hodgkin's disease, are quite radiosensitive, whereas others, such as squamous cell epitheliomas, may offer a considerable degree of resistance to irradiation. Radium can often be implanted throughout such growths, but this should be supplemented by external irradiation with radium or roentgen rays. In some institutions the growth is first destroyed by electrocoagulation; radium needles or radon seeds are then implanted throughout the margins and base of the destroyed mass of tissue, and these procedures are supplemented by external irradiation. This also applies to tumors of the tonsil. As for simple lymphoid hyperplasia of the tonsils, treatment with roentgen rays is simpler than with radium. Surgical treatment in conjunction with, or exclusive of, irradiation may sometimes be advisable.

Carcinoma of the Thyroid Gland.—Like adenocarcinoma of any other organ, adenocarcinoma of the thyroid gland must be classified among the radioresistant tumors. Ordinary carcinoma of the gland, on the contrary, is more susceptible to roentgen rays, and, next to embryonal carcinoma of the testis and carcinoma of the uterine cervix, is the most sensitive of all carcinomas. Why this should be so has not yet been made clear, but the fact is undeniable. Usually such a tumor is discovered by the pathologist in the course of a microscopic inspection of thyroid tissue excised by the surgeon on the clinical assumption of simple adenoma of the gland. In any event, thorough roentgen irradiation of a primarily inoperable tumor of this variety, and even of metastatic deposits in the mediastinum, skull or elsewhere, often causes the neoplastic elements to retrogress or disappear. Although such retrogression may be temporarily complete, it is almost never permanent. The tumor may disappear and the patient may be well for one or two years, or even longer, but it may generally be counted on to reappear sooner or later. Nevertheless, radiotherapy is distinctly worth while as a means of furnishing temporary and sometimes prolonged relief from symptoms.

Carcinoma of the Breast.—The consensus still is that the best treatment for mammary carcinoma in the operable stage is radical amputation of the breast. From present indications it appears possible that this opinion may subsequently be modified to some extent, but the time for any general departure from present methods has not yet come. In most institutions the method in vogue is radical amputation of the breast, followed, as soon as the condition of the patient allows but generally one or two weeks later, by thorough irradiation of the affected side of the thorax in the earliest cases, or of the entire thorax in the case of large primary tumors, with or without extension to the tributary lymph nodes. The advisability of preoperative and postoperative irradiation is now being considered and tested.

For thoracic irradiation, some prefer rays of medium wavelength while others employ rays of short wavelength. The quality of rays must be governed largely by the method of irradiation. When the patient is irradiated only after operation, the treatment should be repeated once or twice at intervals of from three to six weeks; but to repeat such treatment indefinitely seems excessive and useless. If two or three thorough courses of postoperative irradiation should fail to prevent recurrence, it is not likely that indefinite repetition can be successful. Moreover, if the latter procedure is followed and carcinoma should recur in spite of it, the recurring lesions are not likely to be influenced favorably by further exposure to the rays. The results of a sound operation combined with sound postoperative irradiation appear superior to those of operation alone, but the evidence of such superiority is not so conclusive as might be desired. The reason is that few institutions or surgeons in private practice have undertaken a fair and thorough test.

If undertaken at all, preoperative irradiation should be thorough. Radium needles or radon seeds, incorporating sufficient filtration to remove all the beta rays, should be implanted throughout and around the primary growth, and this procedure should be supplemented by converging, or tangential, roentgen irradiation from without. If the primary growth is too large for effective implantation of radium or radon, several beams of roentgen rays may be made to converge on the breast. The essential point is that the largest possible dose (total dose) of rays should be concentrated on the area occupied by the tumor. The axillary space also should be thoroughly irradiated.

When metastasis to the axillary nodes, or to these and to the supraclavicular nodes, has occurred, however, the surgical indications are no longer clear. Indeed, a growing body of opinion favors abstention from surgical procedures and advocates radiotherapy. Moreover, one point seems increasingly clear; this is that, if a mammary carcinoma has once been pronounced inoperable, it should usually be thenceforth regarded as inoperable, regardless of the degree of improvement that may follow radiotherapy. Occasionally for special reasons this rule may be disregarded, but in most cases it should stand. The rule is of the greatest significance in cases of carcinoma affecting the breast during pregnancy and during the period of lactation. If under these circumstances the rule is disregarded because the primary growth has retrogressed and has become freely movable and because amputation of the breast then seems technically feasible, rapid and widespread extension of the malignant process is prone to occur.

When mammary carcinoma is definitely inoperable, radiotherapy may still accomplish much for the patient. Even when ulceration threatens or has actually occurred, thorough roentgenization can often be counted on to cause the potential or actual ulcer to heal and the primary and secondary malignant elements to recede and sometimes to disappear. Pain in the back, radiating to one or both lower extremities and indicating metastasis to the lumbar portion of the spine or to paravertebral lymph nodes in the same region (the pain being caused by pressure on branches of the lumbosacral plexus), can usually be relieved by exposure of the lower thoracic and lumbar regions to roentgen rays through parallel fields on each side of the median line, the rays being directed so as to converge on the vertebrae and tissues immediately anterior to them.

When carcinoma, originally affecting the breast, recurs in the same or in another region, well planned radiotherapy may still control the lesions for months or years and may relieve pain for prolonged periods. The same is true of metastasis to certain regions, such as the lumbar portion of the spine or the paravertebral lumbar lymph nodes, causing pain in the back radiating to one or both lower extremities.

Carcinoma of the Uterus.—The favorable effect of combined radium and roentgen treatment on carcinoma of the uterine cervix is well known. It is not certain whether such excellent results depend chiefly on the exceptional radiosensitiveness of cancer in this situation or on the comparative facility with which, in early cases at least, a cancericidal dose can be delivered to every portion of the cervix. It is certain, however, that much of the favorable influence of the treatment must be credited to radium and only a minor part to roentgen rays. The purpose of external roentgenization is to supplement the intra-uterine, cervical and vaginal applications of radium and to increase the total dose of radiation reaching the cancer cells, especially outlying cells in the broad ligaments and pelvic lymphatics. The proof that such supplementary external irradiation plays a certain part in the final result is to be found in the fact that, in certain institutions in which radium is not available, roentgen irradiation yields results which, though not comparable to those of radium treatment alone, are distinctly worth while. Also, other tests have shown that the combined treatment is better than radium irradiation alone. Although a few surgeons still advocate hysterectomy for carcinoma of the cervix, the number of those who no longer advise operation in such cases is steadily increasing. The reason for this gradual shift of surgical opinion is that the results of radiotherapy and surgery are approximately equal, but the former has the advantage of avoiding the mortality of the latter.

With reference to carcinoma of the body of the uterus the situation is somewhat different. Here surgical intervention (hysterectomy) is still advocated in preference to radiotherapy whenever the malignant situation has not passed beyond the bounds of operability. Radiotherapy is usually reserved for the inoperable cases, the aim being to bring about as much temporary improvement as possible. During the last few years, however, medical opinion has shown a tendency to shift toward radiotherapy.

Carcinoma of the Bronchus.—Sometimes external, converging irradiation with roentgen rays may usefully be supplemented by implanting radon seeds directly into an intrabronchial growth (through a bronchoscope), but

in most cases such a procedure is difficult. Instead, that portion of the growth which can be seen through the bronchoscope can be electrocoagulated, and the entire region can be exposed to several converging beams of roentgen rays.

Carcinoma of the Esophagus.—Radium and roentgen rays can sometimes be effectively combined, but the results heretofore reported have not been striking. Highly filtered radium introduced into the affected portion of the esophagus, supplemented by a large total dose of roentgen rays from without, might lead to some improvement in results, but the natural resistance of such lesions to irradiation, the difficulty of administering adequate irradiation to every part of the growth, and the tendency to mediastinal infection will probably continue to limit the value of treatment.

Carcinoma of Gastro-Intestinal Tract.—Generally speaking, carcinoma of the stomach is comparatively resistant to irradiation. A certain proportion of patients suffering from such lesions may derive moderate improvement for a time, but such improvement is seldom great and seldom lasts more than a few months. Moreover, when the general condition of the patient is bad, radiotherapy sufficient to influence distinctly the malignant process is likely to cause further deterioration and weaken the already strained power of resistance, particularly if the tumor has invaded the liver. No possible good can come from exposure to roentgen rays under such circumstances. In carcinoma of the large bowel and especially of the rectum, radiotherapy may be worth while. The symptoms may be considerably or entirely relieved for a time, but permanent cure cannot be expected. In carcinoma of the rectum or the rectosigmoid portion of the colon, radium applied directly to the growth and roentgen irradiation from without are often followed by substantial benefit, which may continue for months. In other cases irradiation may inhibit the growth of the malignant process to some extent but for only a short time. Therefore, radiotherapy should be used before or after operation in operable cases or should be reserved for inoperable cases.

Tumors of the Kidney.—Most renal tumors in adults cannot be regarded as radiosensitive, but embryonal carcinomas in adults or in children are quite radiosensitive. Surgical removal alone seldom results in cure. The effect of radiotherapy on hypernephroma and primary carcinoma in the adult is usually slight and transient, but on embryonal tumors the effect of thorough irradiation is to cause rapid regression, sometimes to the point of complete clinical regression. Unfortunately, such regression is not lasting; within a relatively short time the tumor again begins to grow and a fatal outcome is the rule. Recently, the idea of thorough irradiation to the point of maximal regression, followed by surgical removal of the affected kidney and residue of the tumor, has been advanced and is now being tested.

Tumors of the Skin.—Basal-cell epithelioma is quite amenable to roentgen treatment; a large percentage of such lesions can be cured permanently in this manner. Massive doses of rays of long or medium wavelength, or both combined, are preferable, but fractional doses at relatively short intervals may be nearly as effective if the total dose within a given time is sufficient. Treatment with small doses at random should never be undertaken. By massive single doses is meant from two to ten times an erythema dose at one sitting. One half of this dose may be given with unfiltered roentgen rays generated at a potential between 80 and 100 peak kilovolts, and the other half with rays filtered through 3 or 4 mm. of aluminum and generated at a potential between 130 and 140 peak kilovolts. Such a massive dose can be given with safety to an area less than about 2 cm. in diameter, but should never be given to an area larger than this. If the lesion is larger, an erythema dose cannot be greatly exceeded with safety.

If operable, squamous-cell epithelioma should preferably be dealt with by thorough and wide surgical excision, followed by two or three postoperative courses of roentgen irradiation at intervals depending on the dose employed. To undertake to treat such lesions with roentgen rays alone is to risk doing grave injustice to the patient and to assume too great a responsibility. It is true that cure may be effected in this way in some cases if early and well conducted irradiation is employed, but too often a satisfactory initial result is spoiled by renewed malignant activity or metastasis. Melanoblastoma is one of the most resistant of neoplasms. When the primary lesion is small, exposure at one session to several times an erythema dose of filtered rays and to an equal quantity of unfiltered rays may cause the growth to disappear, and the patients remain well. Certainly the method is superior to ordinary surgical excision, but thorough destruction by surgical diathermy may be as effective as roentgen rays. When metastasis has occurred, however, roentgen treatment is generally useless.

Adenocarcinoma.—For some reason, this variety of epithelial cell tumor, regardless of the organ or structure in which it originates, has a higher degree of resistance to roentgen rays than ordinary carcinoma or epithelioma. Some such neoplasms exhibit a certain measure of response to irradiation, but their regression is seldom pronounced or lasting. Exception perhaps should be made of adenocarcinoma of the thyroid gland and of the uterine fundus. Patients harboring such growths, therefore, may be given the benefit of the doubt to the extent of at least one thorough course of roentgen or radium treatment; but if this is not followed by substantial reduction in the size of the tumor and a corresponding improvement in general condition, repetition of the treatment is not likely to affect the issue. Moreover, to raise undue hope in the patient or relatives is to court loss of reputation.

Sarcoma.—Sarcoma of the soft tissues is comparatively resistant to roentgen rays or radium and few such tumors are ever cured by these or any other methods of treatment. The effect of irradiation on the tumors depends largely on their situation and on the facility with which a large total dose of rays can be delivered to every part of the growth. When it projects from the surface of the trunk or involves an extremity, the method of multiple converging beams may cause marked or complete retrogression of the primary tumor; but the well known tendency of such neoplasms to rapid metastasis only too often neutralizes what might otherwise be an excellent result. The round-cell or spindle-cell varieties of sarcoma are relatively more susceptible to irradiation than the fibrosarcoma, and especially the myxosarcoma. Notoriously slow to metastasize, a primary fibrosarcoma can sometimes be made to undergo more or less pronounced regression; but it seldom disappears completely. The myxosarcoma, on the contrary, is almost completely insensitive to the rays. Bone tumors will be dealt with separately.

Bone Tumors.—The most radiosensitive of all malignant bone tumors is the endothelial myeloma of Ewing, in which thorough and well planned roentgen or radium treatment may cause the tumor or tumors to disappear completely. The method of applying the treatment must vary according to the circumstances in each case, but it is important, after the growths seem to have disappeared, to give at least one more course of treatment in order to make the effect last longer. Careful clinical and roentgenologic scrutiny for metastasis should be made, because, if adequately treated, it also may disappear.

Chondrosarcoma is distinctly less radiosensitive than endothelial myeloma, but somewhat more so than the true osteogenic sarcoma of bone. Few chondrosarcomas or osteogenic sarcomas are ever permanently cured by any method of treatment, including surgical amputation of the affected extremity. Almost invariably metastasis to the lungs robs the radiologist as well as the surgeon of the opportunity to boast of a successful result. Nevertheless, regression of the tumor and temporary improvement in the condition of the patient may often be brought about. The earlier and the more thorough the treatment, the greater the chance of at least temporary, and possibly of permanent, success.

The tendency of bone tumors to develop in children brings up one point that must not be lost sight of. Irradiation of the rapidly growing bones or muscles of a child is prone to retard or permanently interfere with the growth of these structures. This is a minor evil in comparison with the lethal tendency of the neoplasm, but the attending physician, surgeon or radiologist should be aware of this fact and should impart his knowledge to the family beforehand in order to avoid ultimate disappointment and recrimination. The older the child the less the tendency of the rays to produce such an effect; but if children are less than 10 years of age, more particularly if they are less than 5, exposure to radiation of sufficient intensity has a marked regressive action on the tumor; but if repeated several times at intervals of from three to six or eight weeks, a deleterious effect will be produced on the subsequent growth of bones and muscles exposed to the direct action of the rays. Another point to which it may be well to call attention is that excessive irradiation, after causing regression of the tumor, may lead to abnormal repair of the bone, and this may mislead the physician into believing that the malignant process is still active when it is not.

Myeloma.—In many cases myeloma is not discovered until the process is rather general and has affected many bones. This is probably because, for some time after the onset of the disease, the symptoms are not sufficiently severe to cause the patient to seek medical advice early. When the malignant process is not too widespread, roentgen irradiation may result in considerable and sometimes marked improvement, which may continue for months or even for more than one year. Substantial improvement may likewise be obtained when the disease has involved many parts of the skeleton; but in this event the degree of improvement usually is smaller and the improved condition of the patient does not last so long.

Metastasis from Bone Tumors.—The majority of neoplasms primarily affecting bone metastasize to the lungs. Pulmonary metastasis from endothelioma can often be influenced to some extent by adequate irradiation, but such influence is seldom marked or prolonged. Extension of the malignant process to other bones also may be arrested or controlled for a time but, under these circumstances, a cure is out of the question. Nevertheless, pain and disability may be sufficiently relieved to make treatment worth while. Not infrequently the metastatic tumors prove as radiosensitive as the primary growth and may disappear completely; later, metastasis to other bones and gradual physical disintegration occur.

Metastasis to the lungs from chondrosarcoma or osteogenic sarcoma seldom can be appreciably influenced by irradiation, and all therapeutic efforts usually prove unavailing.

Metastasis to Bones from Primary Tumors in Uterus, Rectum and Bladder.—In the majority of cases metastatic bone lesions secondary to cancer of the uterus, rectum, bladder and other organs seldom can be controlled for more than a short time by irradiation; but pain may often be relieved and perceptible, temporary improvement in the general condition of the patient may sometimes follow thorough irradiation.

Brain Tumors.—Since nerve cells naturally possess a high degree of resistance to roentgen rays, tumors of the brain also are comparatively insensitive to irradiation. Yet, probably because such neoplasms are largely made up of embryonal cells, radiotherapy may often cause the neoplasms to retrogress for months and sometimes for several years, with corresponding improvement in the condition of the patient. This is because the anatomic situation of the cerebrum and cerebellum and the conformation of the head make it possible to administer to the tumor very large doses of rays. In such cases an exceptional opportunity is offered to utilize the method of multiple converging beams. From four to eight beams of rays may be concentrated from as many different angles, often with excellent, though temporary, results. Unless a large quantity of radium is available and permits the treatment of such tumors from a distance, much as in the case of roentgen rays, the latter are to be preferred, because a larger dose of radiation can thus be delivered to the growth itself. The more cellular the neoplasm, the greater the influence of the rays; irradiation has much less effect after the tumor has become cystic. Roentgen rays of short wavelength are the most efficacious, and at least three courses of treatment, each requiring from four to eight days, according to the number of fields irradiated, at intervals of six weeks, should be given. This may be usefully repeated later in the event of renewed malignant activity and recurrence of symptoms.

If a quantity of radium sufficient for thorough crossfire of the entire tumor from a distance is available, radium treatment may be as effective as treatment with roentgen rays, and possibly more effective. But to attempt to treat an intracranial tumor with 50 mg. of radium or less is not likely to yield great improvement.

Tumors of the Hypophysis.—Much the same may be said of tumors of the hypophysis. In a certain proportion of such tumors, repeated exposure of the hypophyseal region through multiple fields is followed by relief from headache and improvement in vision. Unfortunately, the relief thus obtained is not permanent as a rule, although it may last several months or even several years.

General Considerations.—"Deep Therapy": For many years radiotherapists and physicians in general have come to speak of superficial or deep roentgen therapy. The expression "deep therapy" really came

into vogue to distinguish rays of short wavelength, generated at a potential approximating 200 peak kilovolts, from the rays of long or medium wavelength used previously, and still used extensively by many radiologists. Moreover, during the past few years the therapeutic possibilities of rays generated at voltages varying between 300,000 and 1,000,000 have been investigated, and the qualification "deep" becomes all the more confusing. At the present time, such a designation only tends to mislead, because it is so often misused by physicians without any reference to qualitative distinctions. In fact, physicians who speak or write about so-called deep therapy often cannot explain what they mean by the terms "superficial therapy" and "deep therapy," which might well be discarded.

RADIATION SICKNESS

Exposure to roentgen rays is often followed by anorexia, nausea and vomiting. Some patients may present only one of these digestive disturbances, while others may have all three in a mild, moderate or severe form. A small proportion of patients may have none of these disturbances but complain only of weakness or nervousness. The intensity of such systemic reaction depends on the extent (area) of body surface and on the part of the body exposed, as well as on the ease with which the digestive equilibrium of the patient may be disturbed. Exposure of the extremities to a moderate dose of rays seldom gives rise to much reaction, but large doses, especially if administered to several fields at one time, are prone to be followed by some degree of reaction. Irradiation of the head, neck and thorax often causes a systemic reaction, the severity of which varies with the dose, duration of exposure and area of surface exposed. The part of the body most susceptible, from the standpoint of radiation sickness, is the upper half of the abdomen. This circumstance, together with the fact, demonstrated by experiments on animals, that the small intestine is the most radiosensitive portion of the digestive tract, has caused the idea to be advanced that radiation sickness is due to the influence of the rays on the small intestine. Such a view is unsound because, while exposure of the small intestine undoubtedly tends to increase the systemic reaction, the reaction so commonly follows exposure of parts of the body remote from the intestine that the main cause must be sought elsewhere. Of the many hypotheses that have been offered to explain the phenomenon, the one that has the greatest number of adherents is that radiation sickness results from the circulation throughout the system of toxic products of cellular destruction in organs and tissues particularly sensitive to the action of the rays.

Numerous efforts have been made to prevent or counteract such reaction, but with no great success. The importance of thorough ventilation of the treatment rooms to remove the noxious gases generated by the electrical apparatus is great. The value of numerous drugs has been thoroughly tested; none can be depended on to prevent or diminish the intensity of the reaction. Careful preparation of the patient by evacuation of the bowel and preliminary alkalinization are valuable measures. Another measure that may help to minimize the disturbance is to have the patient fast for two or three hours before and after a treatment session. One should avoid giving too great a dose at one session or crowding a course of treatment into too short a period. In some instances unsweetened lemon juice in iced water, sipped spoonful by spoonful, may tend to allay gastric irritability; in others champagne, if available, or ginger ale may have the same effect. In many instances, however, the reaction does not subside until several hours or days after the completion of the treatment. Even then, the anorexia may disappear slowly.

COUTARD METHOD

It is a well established principle of radiotherapy that complete regression of a tumor requires a certain dose of radium or roentgen rays. Such a dose varies with the natural radiosensitiveness of the cells of which the growth is composed. Complete regression of squamous cell epitheliomas or carcinomas is known to require a total dose corresponding to about eight times the tolerance limit of the skin. If the tumor is at the surface and if the area that it occupies is small, an adequate dose is readily feasible. But if the area occupied by the growth is large, an adequate dose cannot be given through a single field without danger. When a large tumor projects above the surface, or when it is situated in a region that forms a natural projection, it is sometimes possible to concentrate on it a sufficient dose by directing toward it several beams of rays through a corresponding number of separate fields. Also, when the tumor is situated deeply within the body, it may be possible to arrange several beams so that they converge on the neoplasm. Even then, however, it is often difficult or impossible to give a total dose sufficient to cause the growth to retrogress completely, because the integrity of overlying or surrounding structures may not be unduly jeopardized.

Experiments on animals have shown that a dose of roentgen rays or radium sufficient for permanent sterilization of the testis of a rabbit, if given at one time, induces necrosis of the overlying skin. If such a dose is divided into five or more fractions and is given over a period of from five to seventeen days, sterilization of the testis is induced without severe or permanent injury to the skin. On the basis of many older experiments it was well known that the radiosensitiveness of cells depends largely on their rate of metabolism: in other words, on the rate of mitotic division or natural life cycle of the cells. Such considerations led to the postulate that irradiation at low intensity and in small daily increments over a period of time should be more effective and less prone to injure the intervening normal tissues.

On these grounds Coutard began, about 1920, to apply these principles to the treatment of epitheliomas of the pharynx and larynx. Rays generated at 185,000 or 190,000 volts were passed through heavy filters of zinc or copper, partly to diminish their intensity and partly to increase the homogeneity of the beam so as to diminish the tendency to reaction of the skin. With such a scheme of treatment, small doses were given daily or twice daily for from fifteen to fifty days or longer, and Coutard thus found it possible to deliver to the region occupied by the tumor total doses from five to eight times greater than had been possible by other methods, without permanent injury to the skin or mucous membranes. Moreover, the proportion of patients cured by this method is greater than had previously been possible by any other technic of irradiation. Other radiologists, notably at Radiumhemmet, Stockholm, have applied the same principle with radium, with equivalent, if not even better, results.

The Coutard method and various modifications are now being tested for many other kinds of tumor in different parts of the body. In fact, the danger is that such tests may be carried too far.

IRRADIATION AT HIGH VOLTAGES

Soon after the war, radiotherapy entered a new phase. Previous experience had shown that, in attempting to treat the more resistant neoplasms, especially when they were situated deep in the chest or abdomen, the rays available at that time were not as effective as they might be; this was thought to be due to the fact that the rays could not penetrate in sufficient quantity the portion of the body in which the tumor was situated. Therefore, a demand for more penetrating rays arose, and tube designers and manufacturers of apparatus proceeded to satisfy this demand by providing generators operating at from 200,000 to 300,000 volts. Such generators, with the new tubes that soon appeared, enabled the therapeutic radiologist to deliver to deeper parts of the body a much larger quantity of rays. Moreover, modifications in technic to take advantage of this development were rapidly devised. The result was that certain tumors which previously had not been amenable to radiotherapy now became so, at least to a certain extent.

In spite of these improvements, it became apparent that certain tumors were not greatly influenced by any technical variation and this led to a demand for still more penetrating rays, the idea being that, if rays of sufficient penetration could be obtained, even resistant tumors could be made to retrogress more than had been possible previously.

Besides the reasons that I have mentioned, still other reasons came into play. The high cost of radium prevented many institutions and private radiologists from using radium for external irradiation at a distance. Only a few institutions in the world have a sufficient quantity of radium to apply it in this way. During the last five years, generators capable of operating at from 500,000 to 1,000,000 volts have been designed, and tubes capable of producing rays at such voltages also have become available. Rays generated at such high voltages are more penetrating than those used heretofore and, while they do not correspond absolutely to the gamma rays of radium, their quality is such as to yield results that somewhat approximate those obtained with radium. Another advantage of roentgen treatment at high voltage over a large quantity of radium used for external irradiation at a distance is that at smaller expense a larger number of patients can be treated in the same space of time. While these developments in apparatus are desirable and advantageous, it must not be thought that they will replace all other apparatus now in use for roentgen therapy. Apparatus of this kind will probably enable the therapeutic radiologist to deal more effectively with some of the more resistant varieties of tumor and to this extent will probably yield better results. Also, it will probably tend to replace large quantities of radium for external irradiation; but it would be an error for any one to think that installations operating at between 500,000 and 1,000,000 volts are going to revolutionize radiotherapy. No doubt, some institutions desiring to "keep abreast of the times" will go to considerable expense to install such apparatus, in spite of the fact that the character of the work of these institutions does not require such powerful apparatus. For the present, at least, it is important to recognize that radiotherapy at higher voltages is in the experimental stage; but even when it passes out of this stage it would seem sufficient if a few installations, properly distributed over the country, should be available.

Committee on Foods

ACCEPTED FOODS

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

1. CHERRY BLOSSOM BRAND CRYSTAL WHITE SYRUP
2. CHERRY BLOSSOM BRAND GOLDEN SYRUP

Distributors.—Alpena Wholesale Grocer Company, Alpena, Mich.; Grand Traverse Grocery Company, Traverse City, Mich.; Sault Wholesale Grocers, Sault Ste. Marie, Mich.

Packer.—Penick & Ford, Ltd., Incorporated, Cedar Rapids, Iowa.

Description.—(1) A table syrup; corn syrup sweetened with sucrose. Same as Penick's Crystal White Syrup (THE JOURNAL, April 9, 1932, p. 1268). (2) A table syrup; corn syrup flavored with refiners' syrup. Same as Penick's Brand Golden Syrup (THE JOURNAL, April 2, 1932, p. 1159).

1. COMMANDER BRAND GRAPEFRUIT
2. COMMANDER BRAND FLORIDA GRAPEFRUIT JUICE
   (WITH ADDED SUGAR SYRUP)
3. COMMANDER BRAND FLORIDA ORANGE JUICE
   (WITH ADDED SUGAR SYRUP)

Manufacturer.—Dr. P. Phillips Company, Doctor Phillips, Fla.

Description.—1. Canned sliced Florida grapefruit sweetened with added sucrose and retaining in large measure the vitamin C content. The same as Dr. P. Phillips Florida Fanci-Cut Grapefruit Slices (THE JOURNAL, Nov. 19, 1932, p. 1781). 2. Canned Florida grapefruit juice sweetened with added sucrose syrup and retaining in large measure the vitamin C content. The same as Dr. P. Phillips Florida Grapefruit Juice (THE JOURNAL, Jan. 7, 1933, p. 43). 3. Canned Florida orange juice sweetened with added sucrose syrup and retaining in large measure the vitamin content. The same as Dr. P. Phillips Florida Orange Juice (THE JOURNAL, Dec. 3, 1932, p. 1948).

LEXIN

VEGETABLE LECITHIN AND ASSOCIATED PHOSPHATIDES WITH COCOA BUTTER

Distributor.—American Lecithin Corporation, Atlanta, Ga., and New York.

Manufacturer.—Hansa Muehle, Hamburg, Germany.

Description.—Soy bean lecithin and associated phosphatides with about 25 per cent cacao fat.

Manufacture.—Soy bean lecithin and associated phosphatides with soy bean oil obtained as described for Margo (THE JOURNAL, Oct. 5, 1935, p. 1119), is washed with acetone to remove the oil. The lecithin residue is admixed with cacao fat (3 to 1) and any remaining acetone is distilled off. The product is packed in barrels or cans, or molded in blocks.

Analysis (submitted by manufacturer).—

	per cent
Moisture	0.6
Ash	5.4
Petroleum ether extract	65.7
Acetone extract	33.8
Total nitrogen (N)	1.0
Total phosphorus (P)	2.5

Calories.—8.5 per gram; 241 per ounce.

Claims of Manufacturer.—An emulsifying agent for use in foods. Contains readily assimilable phosphorus in organic form.

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SATURDAY, DECEMBER 28, 1935

COLLATERAL CIRCULATION IN CORONARY OCCLUSION

The ability of the body to supply the heart with an adequate collateral circulation is less than that for any other major muscular tissue. While the heart is in direct contact with other structures, it has for obvious reasons a minimum amount of continuity with those adjacent. In a recent experimental study by Beck and Tichy,[1] the possibilities of producing a collateral circulation to the heart were reported. In these experiments an extracardiac vascular bed was prepared by utilizing the pericardium, pericardial fat or mediastinal tissues. Continuity was established by the creation of adhesions. These were produced by incision of myocardium and suture of pericardium into the wound or by removal of epicardium and endothelial lining of the pericardium. The stimulus necessary to bring about vascular continuity was a reduced or subnormal pressure in the coronary bed, which was obtained either by slow or by complete occlusion of the coronary arteries. The report was based on a study of 103 dogs in which one or more operations were carried out to produce a collateral circulation to the heart, and on sixteen dogs in which various methods were used for injection of the heart through the extracardiac anastomoses. The experiments were begun with the hope of being able to destroy or obstruct the entire arterial coronary circulation and have a new collateral circulation develop to take its place. This was not successful, though in one experiment about 85 per cent of the total cross-sectional area of both coronary arteries was occluded with survival and normal activity tolerance of the animal. In many others, large branches were occluded with survival of the animal. The experiments showed, moreover, that vascularization of the myocardium from a collateral bed was slight or absent if the coronary circulation was normal. In other words, the blood vessels grow into the myocardium only when the latter has need for more blood. Beck and Tichy believe, therefore, that these experiments demonstrate that a collateral bed can become the major source of blood supply to the heart.

In an attempt to determine whether these experimental observations could be in any way applied to man, a study was made of ninety-four human hearts in which a major coronary artery had been occluded.[2] All were judged to have sustained a major trunk occlusion, either because the site was identified or because the infarct was so large, so uniform in character and so situated anatomically that, despite inability to determine the exact location of remote occlusion, it could be regarded with certainty to have occurred. Only fourteen of these died following the first occlusion. If they are truly representative, it would appear that the majority (86 per cent) survive the first coronary occlusion. Moreover, most of these (70 per cent of the entire group) had periods of cardiac competence varying greatly in duration after the primary occlusion. The significance in relation to the practicability of artificially inducing a collateral coronary circulation is obvious. Anatomically two types of collateral channels develop in the dog as a result of surgically induced pericardial adhesions and the same type of anastomoses might reasonably be expected to develop in man. The superficial anastomoses between the coronary arteries in the epicardium are increased, and the epicardial barrier between the coronary arteries and the arteries of the parietal pericardium and mediastinum is destroyed so that anastomoses between them occur. On anatomic grounds it would thus appear likely that such anastomoses would serve to protect the heart against the failure of collateral coronary circulation that usually determines death.

Moritz and Beck thus summarize the situation:

> On the assumption that thrombotic occlusion of a major coronary artery can be recognized clinically, it is probable that the diagnosis could have been made in life in eighty of these ninety-four patients. Only fourteen patients died as the direct result of the first major coronary occlusion. Of the eighty patients who survived the first occlusion, the question is whether or not they could have been protected against disastrous results from subsequent occlusions by the production of extracardiac coronary collateral circulation.
>
> In thirty-seven of these eighty cases, concomitant disease or continued cardiac incompetence rendered the operative risk unjustifiable. The remaining forty-three patients might have been benefited by the production of the additional collateral circulation. With the exception of seven patients, who died of other causes, all died of subsequent attacks of coronary thrombosis.

Thus there was a period after the first coronary occlusion in the lives of forty-three individuals when the production of extracardiac coronary collateral circulation might have been feasible and beneficial.

While surgery of the human heart is in a relatively early stage, the studies here reported seem to offer a physiologic and anatomopathologic basis for discriminative operation in certain cases of coronary thrombosis. The actual application of these principles, however, remains for future action and analysis.

1. Beck, C. S., and Tichy, V. L.: The Production of a Collateral Circulation to the Heart: An Experimental Study, Am. Heart J. **10**: 849 (Oct.) 1935.

2. Moritz, A. R., and Beck, C. S.: The Production of a Collateral Circulation to the Heart: Pathological Anatomical Study, Am. Heart J. **10**: 874 (Oct.) 1935.

GOLD THERAPY IN ARTHRITIS

The use of gold as a remedy is not new. The value of the metal has always conferred upon it possibilities for symbolic and suggestive therapy. Recently, however, gold has been used seriously and extensively. The multitude of disorders treated by such preparations is evidenced by the numerous titles listed in the *Quarterly Cumulative Index Medicus* under "Gold Therapy." Major attention has been directed toward its use in tuberculosis of various forms, asthma, arthritis and certain skin diseases.

The precise way in which gold acts is not known. It seems improbable that, in vivo, gold has any direct action on organisms. It has been suggested that it may act by "stimulating some defense forces in the patient," [1] most probably the cells of the reticuloendothelial system. Such an action is similar to that of nonspecific proteins. Gold is excreted largely through the kidneys and to a lesser degree through the intestine and bronchial mucous membrane. In the experimental nephritis of rabbits given large amounts of gold, excretion takes place mainly through the convoluted tubules, the glomeruli taking little if any part. The glomeruli remain undamaged except for slight intraglomerular congestion observed in a few cases. The nephritis produced therefore seems to resemble that caused by mercury bichloride. The elimination, however, does not occur quantitatively or rapidly, and an unknown proportion of the gold is probably retained in various tissues for a considerable time.

Although scientific reports on gold therapy are infrequent in the domestic literature, several recent reports have appeared in continental and British journals, especially with reference to its use in rheumatoid arthritis. In one by Slot, Deville and others,[2] six cases of acute and subacute rheumatism and fourteen of rheumatoid arthritis were treated with different preparations of gold. The clinicians concluded that in acute and subacute rheumatism in children aurotherapy is of no great value and that it is contraindicated when severe carditis is present. In rheumatoid arthritis, on the other hand, the results of gold therapy seemed superior to other methods.

Forestier,[3] who reported a great deal of work on the subject, discusses the actions and reactions of gold, the choice of salt and the results of treatment in some types of joint disease. He feels that gold salts in oil suspension given by the intramuscular route are the most satisfactory and that typical rheumatoid arthritis and perhaps early ankylosing spondylitis are the most promising clinical types. Several series of treatments were given successively at intervals of from six to eight weeks. The first sign of improvement, he says, was relief from pain, and the patient was able to perform movements impossible before treatment. The second sign was reduction of swelling and its eventual disappearance. There was also improvement in the general health, appetite and weight. The laboratory tests (sedimentation rate and resorcin flocculation test) become normal gradually. He reports that he has treated more than 500 patients with various preparations and from 70 to 80 per cent have responded well. Of these, 50 per cent of recent cases and from 20 to 30 per cent of cases of more than two years' duration are reported to have been permanently cured by from two to five series and have remained cured without further treatment for from two to three years. Of course, similar results have been reported for other methods of treatment, including nonspecific proteins, vaccines and even physical therapy.

Recently Pemberton [4] has reported the results of gold treatment of 100 cases of chronic arthritis. Three types of preparations were used, the most recent being sodium gold thiomalate. Up to 2 Gm. was given intramuscularly in oily suspension in graduated doses over a period of six weeks or more. The results were somewhat clouded by the use of some other measures but were nevertheless more than suggestive. Twelve of the cases showed apparent cure, thirty-eight were much improved, thirty-eight were improved and twelve remained the same.

Hartfall and Garland [5] reported another series of 100 cases observed and treated over a period of two years. They favored the intravenous method of administration, using gold sodium thiosulfate. Ten showed apparent cure, fifty-six showed marked improvement, five showed none and three patients died.

All reports are in agreement on the toxicity of gold compounds. Erythematous and even exfoliative dermatitis may be observed. Nephritis with albuminuria, edema and sometimes raised blood urea may occur. A tendency to bronchial irritation has been noted. Shock and collapse occurring immediately after an injection have been reported. Pyrexia has been reported more often by some observers than by others and is probably more frequent when an intravenous preparation is used. Stomatitis and diarrhea sometimes occur. Hartfall and Garland recorded toxic reactions in forty-five of their hundred cases. The most common was generalized pruritus, which occurred in thirty-six cases; erythema developed in twenty-eight of these and four went on to desquamation, in one case severe. Diarrhea developed in ten cases. Soreness of the mouth was complained of in nine cases and three went on to ulceration. In four cases vomiting occurred within a few hours of the injection and one patient had immediate nausea without vomiting. Isolated cases of hyperkeratosis of the soles, pustular dermatitis of the hands and feet, labial edema, herpes zoster, erythema nodosum, lichen

1. Davies, H. M.: Pulmonary Tuberculosis, London, 1933.
2. Slot, Gerald; Deville, P. M.; Hill, N. G.; Williams, Bryan, and Fridjohn, M. H.: Treatment of Arthritis and Rheumatism with Gold, Lancet **1**: 73 (Jan. 13) 1934.
3. Forestier, Jacques: Rheumatoid Arthritis and Its Treatment by Gold Salts, Lancet **2**: 646 (Sept. 22) 1934.
4. Pemberton, H. S.: One Hundred Cases of Chronic Arthritis Treated by Gold, Lancet **1**: 1037 (May 4) 1935.
5. Hartfall, S. J., and Garland, H. G.: Gold Treatment of Rheumatoid Arthritis, Lancet **2**: 8 (July 6) 1935.

planus and purpura were noted. Three of their patients died. One of these developed agranulocytosis three months after the last injection. Two died of purpura, most likely due to the injections. Hudson[6] has reviewed the cases of gold purpura. In eleven of the twenty-two cases under consideration a previous course of aurotherapy had been given, thus suggesting sensitization. The only efficient safeguard, he believes, is systematic platelet counts. In case purpura occurs, blood transfusion should be given without delay.

Thus there is now a considerable amount of independent work indicating the therapeutic effectiveness of gold salts in rheumatoid arthritis. The best preparation, mode of administration and dosage are not a matter of general agreement. The toxicity is marked. The conservative attitude that must still be taken is indicated by the fact that the Council on Pharmacy and Chemistry has not yet accepted any therapeutic gold preparation with claims of usefulness in arthritis. It seems that aurotherapy is promising in a restricted field when some of the doubtful factors become clear and the necessary precautions against toxic reactions standardized. At the present time no one who is not thoroughly familiar with the indications and dangers should attempt its use.

6. Hudson, E. H.: Purpura Haemorrhagica Caused by Gold and Arsenical Compounds, Lancet **2**: 74 (July 13) 1935.

Current Comment

THE NATIONAL FORMULARY VI

When Congress created the Food and Drugs Act in 1906 it included as official standards for the purpose of the act not only the United States Pharmacopeia but also the National Formulary, a book published by the American Pharmaceutical Association. The first Formulary appeared in 1888. At that time the committee stated that "there is and shall be only *one* standard, as to quality and strength, to be followed for all official preparations, viz., the United States Pharmacopeia." The National Formulary—which is, at most, intended only as a stepping stone from and to that authority—was characterized as a standard only for those preparations which are not provided for by this official work. The book may be considered, then, as an interim depository for those drugs which do not merit therapeutic recognition by the U. S. Pharmacopeia. In some ways it seems unfortunate that the life of these drugs should be continued by finding recognition in the official compendium. There are those, however, who feel that since some of these drugs are prescribed by some physicians they should be standardized. The National Formulary is also continuing the policy of being what its name implies—a formulary of certain mixtures, many of which are simply dosage forms of the Pharmacopeial drug. The National Formulary Committee is appointed by the American Pharmaceutical Association. The present committee consists of fifteen pharmacists and one physician, the membership being confined to members of the association. The chairman of the committee, who has worked indefatigably on this venture, is Prof. E. N. Gathercoal of the University of Illinois. The Sixth Revision,[1] which is now available, is superior to previous issues in that it follows the style of the Pharmacopeia rather than being divided into three sections. Eighty of the 119 articles omitted from the Pharmacopeia have been incorporated in this volume. There are 150 other admissions and 319 deletions. The largest single group addition is the Ampules, some containing certain new and old Pharmacopeial items. The National Formulary lists certain types of tablets but, unlike its predecessor, does not prescribe as rigorous standards for the preparations. Essentially, any size tablet of the preparation described in the National Formulary now becomes official. It is interesting to note also that glandular preparations have been included in the National Formulary, but it must be admitted that there is no evidence of the value of some of these preparations given orally. Among them are ovary, corpus luteum and anterior pituitary. The sincerity of the committee that has charge of this work is recognized, but the National Formulary still seems to be a superfluous publication. There should be only one book of official standards for medicinal preparations published in the United States.

1. A comprehensive review of this book will be published in a later issue.

THE TREND OF SYPHILIS AND GONORRHEA IN THE UNITED STATES

The report by Usilton,[1] on the trend of syphilis and gonorrhea in the United States provides evidence of the enormousness of the venereal disease problem. Annually there are apparently four per thousand individuals in the United States with a fresh syphilitic infection and eight per thousand with acute gonorrhea. An additional four per thousand seek treatment for the first time after their syphilitic infection has become late, and another four per thousand present themselves to a physician for treatment of chronic gonorrhea. Thus, more than a million persons seek medical treatment for syphilis in the United States each year, while more than 1,500,000 persons are treated annually by physicians for gonococcic infection. Eighty-four per cent of patients treated for early syphilis in five of the large clinics devoted to syphilis failed to remain under treatment until the disease was rendered noninfectious. In fact, surveys conducted by the American Social Hygiene Association reveal that twice as many persons with venereal disease seek treatment across drug-store counters as come to a qualified medical source for treatment. If two thirds of patients with fresh syphilis who seek authorized medical treatment lapse from treatment before they become noninfectious to others, if more than 500,000 persons each year do not seek treatment until one or more years after acquiring syphilis, and if two thirds of those who acquire the disease seek "drug-store treatment" or receive no treatment, nearly two million persons in the United States are either inadequately treated or fail to receive treatment for syphilis every year. Usilton also makes the significant statement that approximately 186,000 of the potential

1. Usilton, L. J.: Trend of Syphilis and Gonorrhea in the United States: Based on Treated Cases, Ven. Dis. Inform. **16**: 147 (May) 1935.

mothers of this country have active syphilis, with the likelihood of resultant loss of the child four times more often than among nonsyphilitic mothers. These figures provide emphasis to Usilton's statement that "syphilis as a treatment problem ranks first among the contagious diseases of man."

Association News

ABSTRACTS OF MINUTES OF BUSINESS MEETING HELD BY COUNCIL ON MEDICAL EDUCATION AND HOSPITALS IN CHICAGO, DECEMBER 8 AND 9

1. The meeting was called to order at 10 a. m. Those present included Drs. Ray Lyman Wilbur (chairman), Merritte W. Ireland, Frederic A. Washburn, J. H. Musser, Fred Moore, Reginald Fitz, William D. Cutter, Herman G. Weiskotten, Carl M. Peterson, Oswald N. Andersen and Mr. Homer F. Sanger.

2. It was resolved that the minutes of the business meeting of Sept. 15, 1935, be approved.

3. It was voted to reconsider the resolution passed in September to the effect that after July 1, 1938, the Council would no longer list two year schools and it was further voted that such schools be considered individually.

4. It was voted that the nineteen sophomore students at present enrolled in the University of Mississippi School of Medicine may be accepted in approved schools without prejudice to the standing of the latter.

5. It was voted that the American Board of Dermatology and Syphilology be approved.

6. It was voted that the American Board of Radiology be approved.

7. It was voted that the list of pathologists as submitted be approved.

8. It was voted to approve the lists of hospitals and other institutions recommended by the staff.

WILLIAM D. CUTTER, M.D., Secretary.

RADIO BROADCASTS

The American Medical Association broadcasts over WEAF, the Red network instead of the Blue, as formerly, and certain additional stations of the National Broadcasting Company at 5 p. m. eastern standard time (4 o'clock central standard time, 3 o'clock mountain time, 2 o'clock Pacific time) each Tuesday, presenting a dramatized program with incidental music under the general theme of "Medical Emergencies and How They Are Met." The title of the program is "Your Health." The program is recognizable by a musical salutation through which the voice of the announcer offers a toast: "Ladies and gentlemen, your health!" The theme of the program is repeated each week in the opening announcement, which informs the listener that the same medical knowledge and the same doctors that are mobilized for the meeting of grave medical emergencies are available in every community, day and night, for the promotion of the health of the people. Each program will include a brief talk dealing with the central theme of the individual broadcast.

Red Network.—The stations on the Red network of the National Broadcasting Company are WEAF, WEEI, WTIC, WJAR, WTAG, WCSH, WFI-WLIT, WFBR, WRC, WGY, WBEN, WCAE, WTAM, WWJ, WSAI, WMAQ-WCFL, KSD, WOC-WHO, WOW and WDAF.

Pacific Network.—The stations on the Pacific network are KGO, KFI, KGW, KOMO and KHQ.

The next three programs are as follows:

December 31. No broadcast.
January 7. Infantile Paralysis, Morris Fishbein, M.D.
January 14. Diphtheria, W. W. Bauer, M.D.

This program is broadcast occasionally on the short waves through KDKA, Pittsburgh, over station W8XK, 11,870 and 12,210 kilocycles.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ALABAMA

University News.—Dr. John H. Musser, professor of medicine, Tulane University of Louisiana School of Medicine, New Orleans, gave a lecture at the University of Alabama School of Medicine recently; his address was entitled "The Life and Work of Sir William Osler, with Some Personal Reminiscences." The occasion was the observance by the Gorgas Medical Society of the university of the birthday of Gen. William Crawford Gorgas.

ARKANSAS

Society News.—Dr. George E. Knappenberger, Kansas City, Mo., discussed "Gastro-Intestinal Disorders" before the Benton County Medical Society, November 14.——Speakers before the Sebastian County Medical Society, November 12, were Drs. Miles E. Foster and Arthur F. Hoge, Fort Smith, on "Thyroid Surgery" and "Surgery in Diabetes."——Among others, Dr. C. W. Rasco, DeWitt, presented a "Review of Recent Literature Regarding Undulant Fever" before the Arkansas County Medical Society in Stuttgart, November 12.

CALIFORNIA

Lectures by Dr. Houssay.—Dr. Bernardo A. Houssay, professor of physiology and director of the physiologic institute in Buenos Aires, Argentina, lectured at Stanford University, December 7, and at the medical school, December 9, on "The Hypophysis and Resistance to Infection, Intoxication and Cancer." Lectures were also presented before the University of California School of Medicine and the California Academy of Medicine, December 14.

Society News.—Dr. Curle Latimer Callander, San Francisco, discussed "A New Amputation" before the San Diego County Medical Society, December 10.——At a meeting of the Alameda County Medical Association, December 16, speakers were August Vollmer on "The Problem of Crime as Related to Medicine"; Paul L. Kirk, Ph.D., Berkeley, "Application of Scientific Principles in the Investigation of Crime," and Dr. Hubert N. Rowell, Berkeley, "Medicopsychological Aspects of Crime."

Auxiliary Sponsors Health Meetings.—The women's auxiliary of the Alameda County Medical Association sponsored a health institute at the Oakland Civic Auditorium, November 4-5, "to present to the public the fundamental facts of modern scientific medicine for the purpose of building sound public opinion and knowledge relative to the questions of public and private health." Local medical organizations and civic agencies cooperated. Exhibits were included depicting important phases of personal and community health.

Survey of the Blind.—In a survey in California, 3,512 blind persons responded to questionnaires issued to 6,960 blind persons who were recorded in the census. Of the group studied, 12.1 per cent were under 20 years of age, while 54.4 per cent were more than 60. Only eighty-eight of the 3,512 persons surveyed reported that they make even a bare living, while about 95 per cent of the blind in California have no earned income at all and so are wholly dependent economically, either on relatives and friends or on society. The study was sponsored by the bureau of rehabilitation of the state department of education and carried out in cooperation with the state emergency relief administration and the state council for the blind. Its purpose was to ascertain the number of blind persons in the state who are self supporting, the number who are of employable age and in what occupation they have been successful, and the number needing aid for economic or social adjustment.

COLORADO

Personal.—Dr. Robert W. Gordon has been appointed deputy manager of health and charity of the health department of Denver, succeeding Dr. Bertram B. Jaffa.

Society News.—The annual midwinter graduate clinics of the Colorado State Medical Society will be held in Denver, January 23-24.——Dr. Ralph A. Fenton, Portland, Ore., discussed "Facts and Fallacies Regarding Accessory Sinuses" before the Colorado Oto-Laryngological Society, November 16.

GEORGIA

New Society of Pathologists.—The Georgia Association of Pathologists was organized recently with seventeen charter members. Atlanta will be the headquarters of the new society, and officers are Drs. Everett L. Bishop, president; Roy R. Kracke, vice president, and Thomas F. Sellers, secretary. Meetings will be held monthly.

Society News.—Speakers before the Georgia Pediatric Society in Atlanta, December 12, included Dr. Isaac A. Abt, Chicago, on "Progress of Infant Feeding" and "A Child's Heart in Avitaminosis"; Charles E. Bills, Ph.D., Evansville, Ind., "Medicinal Fish Oils" and "Multiple Nature of Vitamin D"; Dr. John A. Kolmer, Philadelphia, "Infection, Immunity and Vaccination in Anterior Poliomyelitis," and Dr. John L. Morse, Boston, "The Thymus Delusions" and "Diagnosis and Prognosis in Pediatrics."——Dr. William F. Reavis read a paper entitled "Cancer in the Lower Urogenital Tract" before the Ware County Medical Society, Waycross, November 6.——An official bulletin for the Georgia Medical Society made its appearance with the October issue. The society was founded in 1804 and since 1908 has been the official medical society of Chatham County. Dr. Michael J. Egan is president, Dr. Cornelius F. Holton president-elect, Dr. Harry M. Kandel vice president, and Dr. Otto W. Schwalb secretary. All are from Savannah.

INDIANA

Portrait Presented to University.—A portrait of the physician immortalized by James Whitcomb Riley in his poem "The Doctor" has been presented to the Indiana University Medical Center, Indianapolis, and hung in the reading room of the medical library, according to the state medical journal. Dr. William B. Fletcher, subject of the painting by Theodore C. Steele, served as a scout during the Civil War. Captured near Big Spring, Va., he succeeded in destroying his notes and maps by lighting his pipe with them while seated near a camp fire, but he was condemned to be shot. After he made two unsuccessful attempts to escape, his identity as a condemned prisoner was lost and by mistake he was sent to Libby prison and was later paroled. Dr. Fletcher served more than forty years as a teacher in the old Indiana Medical College and the College of Physicians and Surgeons in Indianapolis. He died in 1907.

IOWA

Typhoid Outbreak.—Twenty-four cases of typhoid with one death in Polk County during the week ended November 30 were attributed to a contaminated water supply, according to the state health department. The outbreak involved with one exception persons residing, working or visiting at the county farm or attending an adjacent school. The investigation revealed the water supply to be the only factor common to the farm and the school.

Society News.—A symposium on rare fevers was presented before the Decatur County Medical Society, Decatur, November 12, by Drs. John C. Parsons, Creston; Ernest E. Shaw, Indianola, and Herbert E. Stroy, Osceola.——Dr. Elwood P. Russell, Iowa City, discussed "Fractures of the Hip, Thigh and Knee" before the Louisa County Medical Society, November 14.——At a meeting of the Scott County Medical Society in Davenport, December 3, Dr. Charles Hugh Neilson, St. Louis, discussed "Effect of Weather on Human Conduct and Disease."——At a meeting of the Woodbury County Medical Society in Sioux City, November 21, Dr. Edgar V. Allen, Rochester, Minn., spoke on "Peripheral Vascular Disease."——A symposium on inflammatory lesions of the bowel was presented before the Northwest Iowa Medical Society in Sheldon, November 5, by Drs. Harry M. Weber and Philip W. Brown, Rochester, Minn.

KANSAS

Changes in Health Officers.—Dr. James B. Ungles, Satanta, has been appointed health officer of Haskell County, succeeding the late Dr. Loring V. Miner. Dr. William J. Scott, Ottawa, was recently placed in charge of the Franklin County health unit.

Society News.—The Wyandotte County Medical Society was addressed, November 29, by Drs. La Verne B. Spake, Kansas City, on "Indications for Surgery of the Mastoid Process" and Oscar W. Davidson, Kansas City, "Viscerorenal Reflexes."——Speakers before the Rush-Ness Medical Association recently in La Crosse were Drs. John A. Dillon, Larned, on psychosis; Albert C. Armitage, Kinsley, the state medical society, and Otto A. L. Hennerich, Hays, otitis media.——At the annual meeting of the Kansas Hospital Association recently at Emporia, Rev. J. E. Lander, Wichita, was chosen president.

LOUISIANA

Personal.—Dr. Paul T. Thibodaux, secretary of the Lafourche Levee Board and coroner of the Ascension Parish for many years, has been appointed health officer of Donaldsonville; he was also postmaster of Donaldsonville for three terms, resigning this position several months ago, it was stated.

Chaillé Memorial Oration.—The tenth Stanford E. Chaillé Memorial Oration was delivered at the memorial meeting of the Orleans Parish Medical Society, December 7. Dr. Joseph A. Danna gave the lecture entitled "Dr. Chaillé: Dean, Teacher and Friend." Other speakers at this meeting were Drs. William H. Slaughter on "Present Status of Fever Therapy," and Roscoe R. Spencer, "An Explanation of the U. S. Public Health Survey."

MARYLAND

A Year in Baltimore Without a Diphtheria Death.—Not one death was reported from diphtheria in Baltimore during the year and sixteen day period ended October 13, according to the health department. Four deaths occurred in children brought into Baltimore from county homes for treatment at Sydenham Hospital, but these are classified as "nonresident" deaths. The death of a little girl occurred October 13.

Changes in Faculty at University of Maryland.—Dr. James Dawson Reeder, clinical professor of diseases of the colon and rectum, University of Maryland School of Medicine, Baltimore, has been promoted to the rank of professor. The promotion of Dr. John Mason Hundley Jr. from associate in gynecology to professor of clinical gynecology is also announced. New appointments include that of Magnus Gregersen, Ph.D., as professor of physiology.

Personal.—Dr. John A. Skladowsky was promoted, October 23, to be full time medical health officer in the Baltimore health department and was assigned to the Western Health District; he has been connected with the department since 1920.——Dr. Harry Garland Timbres has been appointed assistant in biostatistics at Johns Hopkins University School of Hygiene and Public Health, Baltimore.——The work of the late Dr. Joseph C. Bloodgood at St. Agnes Hospital, Baltimore, will be continued under the direction of Drs. George A. Stewart and Leopold Clarence Cohn. They will also continue his clinic at 3301 North Charles Street. These physicians had long been associated with Dr. Bloodgood.

MASSACHUSETTS

Changes in Medical Examiners.—Dr. John L. O'Toole, Haverhill, was appointed in November medical examiner of the fourth Essex district. Dr. John P. Creed, Haverhill, was named associate medical examiner of the district, and Dr. Charles R. Abbott, Clinton, associate medical examiner of the fourth Worcester district.

Society News.—Dr. Burgess L. Gordon, Philadelphia, discussed "The Mechanism and Effects of Abdominal Compression in the Treatment of Pulmonary Tuberculosis" before the Harvard Medical Society, Boston, November 26.——Speakers before the Norfolk District Medical Society in Norwood, November 26, included Dr. Valmore A. Pelletier, on "Metastasis in Cancer of the Breast."

MICHIGAN

Personal.—Dr. Kenneth W. Dick, Carsonville, has been appointed medical adviser in the Michigan Home and Training School at Lapeer.——Dr. Harold W. Jacox has resigned as assistant professor of roentgenology at the University of Michigan Medical School, Ann Arbor, to become director of the department of radiation therapy for the Western Pennsylvania Hospital at Pittsburgh.

Society News.—Dr. Archibald L. Hoyne, Chicago, addressed the Detroit Pediatric Society, December 4, on "Treatment of Meningococcic Infections."——Dr. Clark D. Brooks, Detroit, discussed "Malignancy of the Gastro-Intestinal Tract, Diagnosis and Treatment" before the Jackson Medical Society in Jackson, November 19.——A symposium on management of the more common skin diseases was presented before the medical section of the Wayne County Medical Society, December 9; the program was arranged by the Detroit Dermatological Society.

State Survey of Goiter.—The state medical society and the state department of health are cooperating in a survey now being conducted in the state to determine whether the depressed income of the average family has brought about an increase of goiter cases. Questionnaires are being given to school children in which they are asked whether the use of iodized salt prevails in their families and whether it ever was used. The children

are questioned about their own diet and given a superficial examination for goiter. Samples sold by all salt manufacturers in Michigan have been collected to be tested in the state agricultural laboratory to determine whether packages sold as iodized salt contain the proper amount of sodium iodide. The results of the survey will be tabulated by the state health department in Lansing, and the conclusions drawn by the state medical society will be presented to the state emergency relief commission.

MINNESOTA

Society News.—Dr. Irving S. Cutter, dean, Northwestern University Medical School, Chicago, discussed "The Physician and the Public" before the St. Louis County Medical Society in Duluth, December 12. —— Speakers before the Medical Society of Blue Earth in November included Dr. Charles N. Hensel, St. Paul, on internal medicine.——Dr. Neil Hamilton Fairley, London, gave a Mayo Foundation lecture in Rochester, November 25, on "Tropical Diseases as They Affect the Practice of Medicine in the Temperate Zone."——Dr. Leo G. Rigler, Minneapolis, discussed "Development of the Use of Opaque Media in Roentgen Diagnosis" before the Rice County Medical Society at Faribault recently. —— At a meeting of the Upper Mississippi Medical Society in Wadena, recently, Dr. Charles B. Wright, Minneapolis, read a paper entitled "Abdominal Symptoms of Heart Disease," and Dr. Theodore H. Sweetser, Minneapolis, spoke on diagnosis and treatment of hydronephrosis. —— Dr. Henry E. Binger, St. Paul, was recently elected president of the Minnesota Academy of Ophthalmology and Oto-Laryngology. Vice presidents are Drs. George E. McGeary and Anderson C. Hilding, Duluth, and the secretary is Dr. Walter E. Camp, Minneapolis.——Speakers before the Minnesota Academy of Medicine in St. Paul, December 11, were Drs. Hendrie W. Grant, St. Paul, on "Visual Field Contractions after Head Injury," and Herbert Z. Giffin, Rochester, "Hemorrhagic Purpura."

MISSISSIPPI

Physical Examinations of Health Workers. — Every health worker in the state had had a physical examination by his family physician, December 15. In addition each worker had had a dental examination, including x-ray and all corrections, typhoid and smallpox vaccination, Schick test and toxoid if positive, and roentgenogram of the chest.

MISSOURI

Society News.—Dr. Carliss Malone Stroud discussed vitamins before the St. Louis Medical Society, December 10, and Dr. Cyril M. MacBryde, "Functional Changes in Liver, Heart and Muscles and Loss of Glucose Tolerance Resulting from Dinitrophenol." At a meeting of the society, December 3, Dr. Ellis Fischel discussed "Cancer of the Rectum" and Dr. Millard F. Arbuckle, "Cancer of the Larynx."

Cancer Program.—The cancer committee of the state medical society sponsored a meeting with the Pettis County Medical Society as host at Sedalia, November 12-14. A clinic was conducted at the Bothwell Hospital in the morning and a public meeting was held in the afternoon. Dr. Ferdinand C. Helwig, Kansas City, discussed "Causes of Cancer"; Dr. Ernest Kip Robinson, Kansas City, "Prevention of Cancer of the Mouth," and Dr. David S. Dann, Kansas City, "Cancer Control." In the evening, Dr. Helwig spoke on "Reaction of Tumors to Radiation"; Dr. Robinson, "Treatment of Metastatic Glands in the Neck," and Dr. Dann, "Management of Cancer of the Lip."

NEBRASKA

Society News.—Dr. Arthur T. Henrici, Minneapolis, was guest speaker at the meeting of the Omaha-Douglas County Medical Society, December 10, on "Fungi in Disease."——Drs. Claude T. Uren and William H. Stokes, Omaha, addressed the Platte County Medical Society, Columbus, November 14, on "Acute Infection of the Middle Ear and Mastoid" and "Treatment of Some of the More Common External Diseases of the Eye," respectively.

NEW JERSEY

"Washington Plan" Adopted.—The Essex County Medical Society has established a medical-dental service bureau in the pattern of the "Washington Plan" for distribution of medical service to low income groups in Washington, D. C. It was expected that the bureau, which is incorporated as a nonprofit organization, would be in operation by December 15.

Society News.—Dr. Alfred F. Hocker, New York, addressed the Monmouth County Medical Society, Asbury Park, recently, on "Tumors of the Head and Neck" and Dr. Frank C. Parker, Norristown, Pa., presented a motion picture of ophthalmic operations. —— Dr. Paul R. Correll, Easton, Pa., addressed the Warren County Medical Society, Belvidere, recently, on "Traumatic Ruptures of the Liver and Spleen and Ruptures of Gastric and Duodenal Ulcers."——Dr. Murray H. Bass, New York, addressed the Hudson County Medical Society, Jersey City, November 6, on "Unusual Forms of Rheumatic Infection in Children."

Health at Camden.—Telegraphic reports to the U. S. Department of Commerce from eighty-six cities with a total population of 37 million for the week ended December 14 indicate that the highest mortality rate (20.5) appears for Camden and the rate for the group of cities as a whole was 12.1. The rate for Camden for the corresponding week of last year was 15.3 and for the group of cities, 11.7. The annual rate for the eighty-six cities for the fifty weeks of 1935 was 11.3 and the same rate appeared for the corresponding period of 1934. Caution should be used in the interpretation of these weekly figures, as they fluctuate widely. The fact that a city is a hospital center for large areas outside the city limits or that it has a large Negro population may tend to increase the death rate.

NEW YORK

The Will Rogers Tuberculosis Hospital.—The name of the National Variety Artists' Lodge, a tuberculosis hospital at Saranac Lake for members of the theatrical professions, has been renamed the Will Rogers Memorial Hospital. The directors of the National Variety Artists' Association turned over the deed to the hospital to the Will Rogers Memorial Fund at a meeting November 21.

Society News.—Dr. David L. Engelsher, Bronx, addressed the Westchester Village Medical Society, November 26, on "Allergy and the General Practitioner."——Dr. Abraham Kaplan, New York, addressed the Dutchess-Putnam Counties Medical Society, Poughkeepsie, November 13, on "Diagnosis of Operable Intracranial Lesions." Dr. Bret Ratner, New York, addressed the society, December 11, on "The Allergy Problem in Childhood."——Dr. Murray B. Gordon, Brooklyn, addressed the Rockaway County Medical Society, November 21, on "Endocrinology in Children."

New York City

Hospital News.—A new research laboratory has been completed at St. Clare's Hospital in connection with the Tumor Institute recently established at the hospital. The laboratory is entirely separate from the laboratory for pathology.——The department of hydrotherapy at the Hospital for Joint Diseases has been reorganized under the direction of Drs. Jerome Weiss, attending physical therapist, and Hans Behrend, formerly of the hydrotherapeutic institute of the University of Berlin.

Scholarships at Post-Graduate School.—Scholarships for qualified graduates in medicine who wish to do graduate study are available at New York Post-Graduate Medical School under the Oliver-Rea endowment. Under the terms of the agreement, applicants from Allegheny County, Pa., other circumstances being equal, will be given preference. Application should be made to the director of the school, 303 East Twentieth Street.

Society News.—Speakers before the Medical Society of the County of New York, December 16, were Drs. Bernard S. Oppenheimer, on "The Era of Chronic Diseases in Medicine"; James C. White, Boston, "Neurosurgery in Cardiovascular Diseases," and Richard Kovacs, "Thermal Therapy in Chronic Disease."——Dr. Beverly C. Smith addressed the New York Surgical Society, December 11, on "Peripheral Nerve Block in Arterial Disease of the Lower Extremity."——Dr. Nathaniel G. Alcock, Iowa City, addressed the New York Society of the American Urological Association, December 13, on "Opinions on Transurethral Resections of the Prostate." —— Drs. James S. McLester, Birmingham, Ala., and James Tate Mason, Seattle, President and President-Elect respectively of the American Medical Association, addressed the Bronx County Medical Society at a special meeting November 25 on the activities of the Association and Dr. Frederic E. Sondern, president of the Medical Society of the State of New York, spoke on the state society's work.——The International Spanish Speaking Association of Physicians, Dentists and Pharmacists at the first meeting of the fall, November 22, held a symposium on the gallbladder with the following speakers: Drs. Henry L. Bockus and William Wayne Babcock, Philadelphia; Walter G. Crump, New York; Jose Arce, Buenos Aires, Argen-

tina, and Eugenio Cienfuegos, Santiago, Chile. Dr. Jacob M. Gershberg, president of the society, gave an account of a recent European trip, where he addressed various medical societies on "Metchnikoff's Theory of Longevity and the Colon."——Drs. Lay Martin, Baltimore, and Harlow Brooks addressed the National Society for the Advancement of Gastro-Enterology, December 18, on "Clinical Interpretation of Jaundice" and "Abdominal Symptoms and Signs of Thoracic Disease," respectively.

OKLAHOMA

Penitentiary Quarantined.—The Oklahoma state penitentiary at McAlester was placed under quarantine by the state health commissioner, December 21, when a case of cerebrospinal meningitis was diagnosed in a convict. Parts of four counties were reported to be under quarantine, December 18, when three deaths were announced in addition to one previously attributed definitely to meningitis and nine others believed the result of the disease (THE JOURNAL, December 21, p. 2079). Canadian, Cleveland, Kiowa and Tillman are the counties affected.

PENNSYLVANIA

Personal.—Dr. William Moore Guilford, Lebanon, celebrated his one hundred and third birthday, November 26.——Dr. Lorne T. MacDougall, Tunkhannock, has been appointed medical director of Wyoming County, succeeding Dr. Frank J. Austin, Laceyville.

Philadelphia

Colleagues Honor Dr. Coates.—Members of the staffs of the University of Pennsylvania, Graduate, Presbyterian and Abington Memorial hospitals gave a testimonial dinner, November 16, in honor of Dr. George M. Coates, professor of otolaryngology, University of Pennsylvania School of Medicine, and professor of otorhinology in the Graduate School of Medicine of the university. A feature of the dinner was the presentation to Dr. Coates of a portrait of himself to be hung in the school of medicine. Dr. Benjamin H. Shuster made the presentation.

Pittsburgh

Society News.—Speakers at a meeting of the Allegheny County Medical Society, December 17, were Drs. Eben W. Fiske, on "Therapy of Rest and Motion"; John W. Fredette, "Treatment of Hand Infections"; Wilton H. Robinson, "Injuries of the Shoulder Girdle, with Particular Reference to the Prevention of Deformity" and Rutherford T. Johnstone, "Interpretation of the Electrocardiogram for the General Practitioner."

RHODE ISLAND

Society News.—Speakers at a meeting of the Providence Medical Association, December 2, were Drs. Kalei K. Gregory, on "Some Clinical Aspects of the 1935 Epidemic of Anterior Poliomyelitis"; George M. Retan, Syracuse, N. Y., "Treatment of Poliomyelitis by Forced Perivascular Drainage," and Maurice Brodie, New York, "Present Problems of Poliomyelitis: Diagnosis, Treatment and Prevention."

VIRGINIA

Society News.—William T. Sanger, LL.D., president, Medical College of Virginia, Richmond, was guest speaker before the Southwestern Virginia Medical Society in Roanoke, recently, on "Trends in Medical Education."——Drs. Frank S. Johns and Emmette T. Gatewood, Richmond, addressed the Mid-Tidewater Medical Society at a meeting at Millers Tavern in October on "Cancer of the Colon" and "Foreign Bodies in the Trachea," respectively.——Dr. Martillus H. Todd, Norfolk, addressed the Northampton County Medical Society, Eastville, recently, on emergency surgery.——The Culpeper County Medical Society was organized recently at a meeting in Culpeper, with Dr. David W. Kelly Jr., Culpeper, as president; John E. Parks Jr., Brandy, vice president, and Otway K. Burnette, Culpeper, secretary.——Dr. Charles R. Austrian, Baltimore, addressed the Virginia Peninsula Academy of Medicine, November 18, on "Differential Diagnosis of Pulmonary Tuberculosis."——The quarterly session of the Southside Virginia Medical Association was held in Petersburg, December 10, with the following speakers: Drs. Wyndham B. Blanton, Richmond, "Medical Economics"; William M. Bickers, Richmond, "Ectopic Pregnancy"; Herbert C. Jones, Petersburg, "Intravenous Pyelography"; Leta J. White and George H. Reese, Petersburg, "Congenital Pyloric Stenosis"; Henry M. Snead, William B. McIlwaine III, Petersburg, and Thomas F. Wheeldon, Richmond, "Unusual Cases of Paralysis." Dr. W. Ambrose McGee, Richmond, opened the discussion.

GENERAL

News of Epidemics.—Three cases of epidemic meningitis were reported in Lawrence County, Ark., December 5. Two cases were discovered in Washington, D. C., in November.——An outbreak of twenty-three cases of diphtheria was reported from Fort Wayne, Ind., December 4.——A Civilian Conservation Corps camp at Red House, N. Y., was quarantined for several days early in December when a case of scarlet fever was discovered. Schools were closed in Waukesha, Wis., to combat an outbreak of scarlet fever during November.——An epidemic of 497 cases of mumps was reported in Fargo, N. D., in November.——Thirty-four cases of typhoid in the vicinity of Saylorville, Iowa, were attributed to contaminated water on the Polk County farm, December 4.

Changes in Status of Licensure.—The New Mexico Board of Medical Examiners recently reported the following actions:

Dr. John L. Kirby, Clovis, license revoked because of his conviction on a narcotic charge.

Dr. James Monroe Wattam, Carlsbad, license revoked because of alcoholism.

Dr. George Frear Johnston, formerly of Clayton, license revoked on the ground that he is an impostor using the license of a physician of the same name who died several years ago.

The Massachusetts Department of Registration recently reported the following action:

Dr. John F. Cummings, Brockton, license revoked, November 15, for conviction in court on a charge of abortion.

The Arizona State Board of Medical Examiners reports the following:

Dr. Claude E. Duvall, Tucson, license revoked, December 3, for violation of the Harrison Narcotic Act.

Medical Section of Science Association.—At the midwinter meeting of the American Association for the Advancement of Science in St. Louis, December 30-January 3, Section N (Medical Sciences) will have a program each morning. Two sessions, those of Thursday and Friday, will be devoted to symposiums on the sex hormones; among speakers will be Dr. George W. Corner, Rochester, N. Y.; Edward A. Doisy, Ph.D., St. Louis; G. F. Marrian, Toronto; Dr. Carleton J. Marinus, Detroit; Dr. Willard M. Allen, Rochester, N. Y.; Dr. Howard F. Kane, Washington, D. C., and Charles W. Turner, Ph.D., Columbia, Mo. Dr. Stanhope Bayne-Jones, New Haven, Conn., vice president for the section, will present his official address, January 1, in the afternoon, on "Bacterial Poisons and Their Antidotes." The preceding afternoon Dr. Bernardo A. Houssay, Buenos Aires, Argentina, will speak on "The Pituitary Gland and the Metabolism of the Body."

Orthopedic Surgeons to Meet.—The fourth annual convention of the American Academy of Orthopedic Surgeons will be held in St. Louis, January 13-16, with headquarters at the Hotel Jefferson. The program includes two symposiums. Drs. Richard H. Jaffe, Chicago, Robert I. Harris and Arthur C. Singleton, Toronto, and Henry W. Meyerding, Rochester, Minn., will present a symposium on bone tumors; the other, on "Fractures About the Elbow," will be presented by Drs. William Darrach, Clay Ray Murray and Philip D. Wilson, New York; H. Earle Conwell, Fairfield, Ala.; James S. Speed, Memphis, Tenn., and Alfred R. Shands Jr., Durham, N. C. Other speakers announced include:

Dr. Donald E. King, San Francisco, The Question of Healing and Regeneration of the Internal Semilunar Meniscus.

Dr. Edward L. Compere, Chicago, Indications for and Against the Leg-Lengthening Operation.

Dr. Alexander Gibson, Winnipeg, Manit., A Method of Spinal Fusion.

Dr. Mather Cleveland, New York, Lateral Curvature of the Spine Following Thoracoplasty in Children.

Dr. Arthur Bruce Gill, Philadelphia, An Evaluation of Present Day Methods of Dealing with Congenital Dislocation of the Hip.

Dr. William B. Carrell, Dallas, Texas, Use of Fascia in Unstable Knees.

Dr. John Albert Key, St. Louis, Metabolic Factors in the Diagnosis and Treatment of Hypertrophic Arthritis.

Dr. Joseph Kite, Decatur, Ga., Treatment of Congenital Clubfeet.

Dr. Frank D. Dickson, Kansas City, Mo., is president of the academy, Dr. Melvin S. Henderson, Rochester, Minn., president-elect, and Dr. Philip Lewin, Chicago, secretary.

Deaths in Other Countries

Charles Richet, professor of physiology, University of Paris, winner of the Nobel Prize in Medicine in 1913, died December 3, aged 85.——**Griffith Evans,** Bangor, Wales, pioneer veterinary surgeon, who discovered Trypanosoma Evansi to be the cause of surra, a disease of horses and cattle, died December 7, aged 100.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Nov. 30, 1935.

The Birth Control Controversy

At present there is a controversy on the subject of birth control. On the whole the medical profession is in favor of birth control under certain circumstances, while it is opposed by certain ecclesiastics, on religious or moral grounds, and is entirely condemned by the Roman church. At the Hunterian Society a debate was opened by the bishop of St. Albans, who entirely opposed birth control by artificial means. He had a strong intuitive sense that the whole thing was wrong and degrading, and in all esthetic and moral judgments the intuitive sense was not to be disregarded. Birth control was a deliberate frustration of the biologic ends of nature. Self control he exalted as the thing which differentiated man from the animal.

Dr. C. P. Blacker, secretary of the Eugenics Society, said that the central question was whether it was possible for the married to regulate an appropriate number of births by the method of abstinence. He had been impressed lately by a number of books from Catholic sources advocating the so-called safe period. It was clear that Catholic physicians and priests were finding difficulties with their patients and penitents in this regard.

Sir Walter Langdon Brown, emeritus professor of physic in the University of Cambridge, said that the world was overshadowed by war, the aggressor being a country trying to find room for its teeming population, and yet in the criminal code of the same country birth control was ranked side by side with banditry. Birth control was directed to life and health, so that a woman would be able to space her family at the proper intervals and give each member a chance of being properly brought up. He believed that celibacy was possible to many and that marriage was the crown of human happiness but that married celibacy was the worst thing possible. He preferred birth control as an alternative to those things which in the old days were regarded as of divine ordinance—war, pestilence and famine.

In the general discussion a young physician said that if physicians did not believe in birth control because it was an interference with nature, logically they ought not to try to prevent or postpone death, for this also was an interference with nature.

Road Accidents and Lighting

To what extent motor accidents are due to poor road lighting is not easily ascertained, but statistics suggesting that it is the cause of many injuries were given in an address by Mr. E. C. Lennox, vice president of the Association of Public Lighting Engineers, at the Public Works, Roads and Transport Congress, held in London. The density of traffic on the roads, he said, was not only steadily increasing but steadily increasing during the hours of darkness. Heavy goods traffic was being carried to an ever greater extent on the roads at night, and this, with the enormous development of omnibus service, has contributed to make us "an eighteen hour nation." Statistics showed that the accident hazard at night was several times greater than by day. He estimated that if the main roads were efficiently lighted, making the use of motor headlights unnecessary, accidents would be reduced by 10 per cent and the increased cost would be counterbalanced by the reduced cost of what the community paid for accidents through insurance companies alone. More than 46 per cent of accidents occurred during the winter months, although traffic was then less heavy than in the summer. In the winter 52 per cent of accidents occurred during the dark hours and in summer more than 20 per cent, when there was least traffic. In a whole year one third of the accidents happened during the dark hours. During the two hours of the session of the congress on the average two persons would be killed and sixty-two injured. If the session had been between the hours of 5 and 7 in the evening, in the dark when traffic would be less, the figures would have been 4.3 killed and 132 injured. These figures could easily be reduced by better public lighting.

In the discussion that followed it was stated that experience at Lewisham (South London) showed that better lighting led to greater speed of motorists and that it was a question how far improved lighting tended toward safety. A county surveyor said that the present system of lighting was detrimental to good driving, because lights placed up in the air, particularly on a gradient, had a dazzling effect on drivers. It might be possible to floodlight the highways in such a way that the light itself would not be visible.

Discovery of a New Blue Dye

The discovery of a new blue dye possessing all the qualities demanded of a pigment is announced by Imperial Chemical Industries, Ltd. It is named Monastral Fast Blue BS and is the first discovery of a blue pigment in more than a hundred years. The two blues at present most used are ultramarine, discovered as long ago as 1704, and prussian blue, discovered in 1826. Until now blue has been the most difficult color in the spectrum, and no blue has given complete satisfaction. There are seven criteria by which a pigment is judged, and even the most efficient blues fail in at least two of these. Thus ultramarine, among other faults, is destroyed by dilute acids, and prussian blue by alkalis. Monastral blue fulfils all the qualifications demanded of a pigment. These are fastness to light, heat, acids and alkalis, chemical inertia, high tinctorial value, and brilliance of shade. Efficient pigments representing all the colors of the spectrum have been discovered. It is thought that the new pigment will be of particular value in the making of printing ink and particularly for three-color printing. Being chemically inert, it may be used in oil painting without risk of detrimental effects. Possibly it may be useful in histology.

International Congress of Physical Medicine

The sixth International Congress of Physical Medicine will be held in London, May 12-16, 1936. This will be the first occasion on which the congress has met in Great Britain. The following will be the principal officers: president, Lord Horder; chairman of executive committee, Sir Robert Stanton Woods; chairman of general committee, Sir Henry Gauvain; honorary secretary, Dr. Albert Eidenow; honorary assistant secretary, Dr. Alexander Cawadias. Those who wish to attend the congress are requested to communicate with the honorary secretary, Dr. Albert Eidenow, 4 Upper Wimpole Street, London, W. 1. The fee for membership is $10.

A Device for the Protection of Radium Operators

The resumption of the use of a 4-Gm. bomb of radium at the Westminster Hospital, reported in a previous letter, has raised the question of the safety of the operators who will be near this powerful source of radiation, and precautions are being taken. While the bomb will be continuously used for the whole twenty-four hours of the day, no operator will work longer than eight hours. During this time he has to spend an average of two minutes each hour in adjusting the bomb to the patient. It is the cumulative effect of these small exposures over a period of months or years that causes concern. In addition to the usual precautions of periodic blood examinations, rest and vacations, and screening of the radium, a new telltale has been devised by the physicist of the hospital. When going on duty the operator will take from a cabinet a small tube of elektron metal and at the same time operate a clocking-in apparatus which indicates the time he starts work. He places this telltale

in his pocket. When he comes off duty he replaces it in the cabinet and at the same time clocks out. The telltale contains a thin rod of insulated elektron charged to about 400 volts. The radiation which the operator encounters in the course of his work causes leakage of the discharge, and this is a measure of the dose of radiation which he receives. Thus a daily record is kept of his exposures. If this is found to be too great, immediate steps can be taken.

Red Cross Airplane for Abyssinia

In response to a request from Lady Barton, wife of the British minister to Abyssinia, an airplane for Red Cross work is about to be sent by the Woman's Advisory Council of the League of Nations. How much it is needed is shown by Lady Barton's statement that while the Ethiopian Women's Work Association (which she helped to form) is supplementing the Red Cross in every possible way, it will take the Unit for the North five weeks to get to the front from Addis Ababa. An experienced airman has offered to fly the airplane without payment from England and will take a pilot, who will remain in the employment of the Ethiopian Red Cross Society.

PARIS

(From Our Regular Correspondent)

Nov. 15, 1935.

The French Orthopedic Congress

The seventeenth annual meeting of the French Orthopedic Society was held October 4. M. Meyer of Strasbourg presented a paper on "Mycotic Infections of Bones and Joints." A good clinical classification of these infections is as follows: the Aspergilloses, the Blastomycoses, the Actinomycoses or Oosporoses, the Sporotrichoses and the Hemisporoses. The history of the clinical discovery of each of these five varieties of mycotic infections was discussed. The portal of entry is most commonly at some point in the alimentary tract, rarely by way of the respiratory organs or as the result of injury. The infection involves the bony structures by invasion either from an adjacent focus in the soft tissues or by the hematogenous route. When the bone infection appears to be primary, a search should always be made for an atrium elsewhere that has been overlooked and probably healed at the time the bone focus appears. A primary mycotic throat infection is a possible atrium. The bone lesions due to the different forms of mycotic infection do not differ in any respect from those due to the ordinary pyogenic organisms. Aside from the yellow granules seen in actinomycosis there is nothing that enables one on gross examination to distinguish one form of mycotic infection from another. Meyer believes that the most characteristic feature is the tendency for the various mycoses to give rise to a localized infection with rarefaction of bone and a well marked "shell" of osteosclerosis. Certain forms give rise to tumor-like formations. Microscopically, each type of infection gives rise to characteristic pictures as a rule, but there are often such protean changes that the diagnosis of a particular mycosis cannot be made until a typical histologic picture and the organism are found in the sections of tissue.

Clinically there are no pathognomonic symptoms. The predilection for involvement of the spine, metatarsal and metacarpal bones and phalanges makes a differentiation from tuberculosis difficult. Localization in the bones of the forearm, tibia and skull resembles syphilitic infection. A mycotic periostitis without suppuration simulates a syphilitic periostitis and, when there is pus formation, a suppurative pyogenic periostitis. In some cases there is acute bone involvement with such high fever, chills and severe pain that it is difficult to distinguish a mycotic from an acute pyogenic osteomyelitis. The same is true of the more chronic cases. There is a fulminating form, the patient dying with symptoms of an acute septicemia.

When the bone is invaded from an adjacent focus, it is seen on roentgen examination to be eroded without any periosteal reaction. In the hematogenous types, roentgen examination reveals one of three changes: a sclerosing osteitis with periosteal thickening, an osteomyelitis with necrosis or an intraosseous gumma in the form of a central abscess surrounded by an osteosclerotic shell.

A differential diagnosis on examination of the films is not difficult from tuberculosis or the polycystic forms of hereditary syphilis or chronic bone abscess. Although there is nothing pathognomonic about the roentgenographic appearance of mycotic bone involvement, one should always be on the lookout for such an infection.

In general, unless the pus from the sinus leading to a bone or joint focus is examined for mycotic infection there is nothing to distinguish such a type of infection from that due to ordinary pyogenic organisms. Early infiltration and a peculiar purplish discoloration of the overlying skin and the presence of multiple fistulas should lead one to look for a mycosis. To detect the latter in the laboratory requires a good deal of experience. If no fistulas exist, an effort should be made after making a small skin incision to obtain some of the secretion with the aid of a pipet. When fistulas exist, the mycotic agents of infection often disappear because of the presence of secondary invaders. The pus should be examined in smears, by hanging drop, by inoculation on culture mediums and into animals.

Mycotic infection of the vertebrae simulates closely that due to tubercle bacilli. The diagnosis is often made only at necropsy. On roentgen examination the only distinctive features of a mycotic infection are the superficial erosion of the bodies of the vertebrae, intervertebral disks and the transverse and articular processes, the last three being seldom involved in tuberculosis. As to joint involvement, this most commonly affects the knee either primarily or as a part of a generalized infection. The inflammatory tumor-like forms of mycotic infection termed mycetomes are rare in Europe but have been observed in America and in Africa. "Madura foot" is the most familiar example of a mycetoma.

In treatment, potassium iodide is to be preferred to all other drugs. One begins with 2 Gm. a day and increases the dose gradually until from 6 to 8 Gm. is given in twenty-four hours over a prolonged period, with intervals of from eight to ten days. Intravenous injection of aqueous solution of iodine has also been employed. Potassium iodide is especially efficacious in infections due to Actinomyces and Sporothrix. Local treatment must never be overlooked. This includes dilute solution of sodium hypochlorite, methylthionine chloride, aqueous solution of iodine, ultraviolet rays and roentgen treatment. In all bone cases, thorough eradication of the foci by operative measures should be carried out and supplemented by general treatment.

In the discussion, Allenbach reported nine personal cases observed during a period of five years. In all, the bone localization was the first clinical evidence of infection. The diagnosis could be made only as the result of the roentgen examination.

Lombard of Algiers had seen only four cases in twenty-five years. He was inclined to doubt the etiologic rôle of the various forms of mycoses and believed they were often only of a secondary character.

VOLKMANN'S CONTRACTURE

Massart of Paris read a paper on Volkmann's contracture. He maintained that such an ischemic contracture followed supracondyloid fracture of the humerus more frequently than fracture of one or both bones of the forearm. It was formerly believed that interference with the circulation as the result of too tight a dressing was the chief factor in the etiology. Frequently such a cause is not to be found. At present the principal part is played by a extensive hemorrhagic infiltration of the involved muscles, which interferes with the return circula-

tion. This has been proved by the rapid relief of incipient symptoms of a Volkmann contracture in a case reported by Moulonguet and Senegaux, following incision of the aponeurosis. Intramuscular hemorrhages without fractures have been observed in hemophiliac patients which gave rise to typical Volkmann contracture symptoms. The circulatory disturbances observed at the onset of this clinical entity, such as modification of the radial pulse and difference in the oscillometric curves of the two extremities, also verify this hypothesis. The subaponeurotic intramuscular serosanguinolent effusion is due to a blocked circulation and resembles the hemorrhagic infarcts observed in the lungs. The muscular changes are really circumscribed aseptic necroses of ischemic origin rather than a retractile myositis.

As to treatment, surgical measures should be applied as early as possible. They include incision of the aponeurosis and at the same time reduction of the fracture and inspection of the nerve trunks; peribrachial sympathectomy, in early cases only, and ligation of the brachial artery if the latter has been injured or is thrombosed. The early period having passed, extension methods give perhaps the best results. Other not generally accepted methods are resection of the radius and ulna, and disinsertion of the flexors and pronators from their attachments to the humerus, radius and ulna.

Lombard of Algiers reported a case in which sympathectomy of the brachial artery had been followed by complete disappearance of the Volkmann contracture symptoms in a boy of 12. The child could use his hand well, but the muscular force of the forearm was still below normal and atrophy persisted.

Froehlich of Nancy maintained that a plaster or splint dressing too tightly applied still must be considered as the principal cause of Volkmann's contracture in cases of fractures of the forearm and lower end of the humerus. He had reexamined seventeen patients and found this to be true of fifteen. The only surgical treatment was a resection of the radius and ulna.

Tavernier believed that the prognosis of the more advanced cases was not very promising. In late cases, resection of the wrist is indicated rather than that of the bones of the forearm.

Billet of Lille reported a case of immediate but only transitory (five days) improvement following a peribrachial sympathectomy. In a typical case without fracture occurring in a hemophiliac patient the Volkmann contracture had disappeared spontaneously. It is advisable in general, in cases of fracture of the elbow and forearm, to wait several days before attempting a reduction.

Meeting of the Therapeutic Union

A large number of foreign and French members of the Therapeutic Union met at Paris October 9. The president is Prof. M. Loeper of Paris. The first paper was on the "Quinine Salts in Cardiac Disease," by Professor Pelzi of Milan, who has found that quinidine is the only drug which can establish a normal rhythm in complete arrythmia due to auricular fibrillation. Quinine is preferable to quinidine in the treatment of extrasystole and in paroxysmal tachycardia. In the former, quinine ought to be given orally, but in paroxysmal tachycardia neither quinine or quinidine is efficacious if given orally. Quinine is especially indicated in cardiac conditions in nervous individuals without organic lesions, in whom the vegetative nervous system functions so badly that there is a resultant disturbance of the cardiac rhythm. These are the individuals to whom the cardiologist has applied the terms "unstable with palpitation, irritable or hyperkinetic hearts," like those seen following the World War. Professor Clerc and also Professor Pende have demonstrated the sedative action of quinine on the vagus in paralyzing the bulbar center and its action as a regulator. It acts also on the sympathetic nervous system; hence its great value in neuropathic conditions of the heart.

Pende of Genoa, Bürgi of Brussels, Decourt of Paris and Delherm of Paris took part in a symposium on viscerospasm. Pende stated that a large number of conditions might give rise to viscerospasm. He mentioned hyperalkalosis, hypocalcemia, hyperphosphatemia, hyperpotassemia, parasympathetic predominance, predominance of parasympathicotonic hormones (acetylcholine, insulin, thymic and splenic hormones, solution of pituitary) or insufficiency of the sympathicotonic hormones (epinephrine, parathyroid extract).

The treatment of all viscerospasm symptoms should be to raise the calcium ion content of the blood, to diminish the alkaline phosphates of the blood and alkalosis in general, especially if one is able to demonstrate a diminished hydrogen ion concentration and an increase in the alkali reserve. The diet should include, as a base, foods with little potassium (oatmeal, milk, meats, fish, eggs, fats and cheese, all of which contain much calcium). As drugs, hydrochloride or phosphoric acid and ammonium, potassium or calcium chloride can be ordered. Among the endocrine products, epinephrine or parathyroid extract is to be preferred. Care must be used in attempting to correct the neurovegetative atonicity with such drugs as atropine or belladonna, which have a direct action on the neurovegetative system.

Bürgi read a paper on the spasmogenic substances and their antagonists. Pilocarpine, acetylcholine, physostigmine and the choline group can, through the agency of the parasympathetic system, give rise to spasms in the nonstriated muscle fibers of the stomach, intestine, uterus and bronchi. The choline derivatives dilate the blood vessels. Especially acetylcholine and its derivatives combat intestinal atony and blood vessel spasm. Lead has a spasmogenic action on the intestine, and barium chloride excites its muscle fibers. Epinephrine and ephedrine derivatives increase the tonus of the sympathetic nervous system and diminish intestinal spasm, but they contract the arteries of the uterus. Atropine and papaverine paralyze the nonstriated muscle fibers. Morphine is spasmogenic for the stomach but paralyzes intestinal peristalsis. The medical treatment of viscerospasm was discussed by Decourt. Every case requires special study before medication is begun. The available drugs can be placed in three groups: (1) those which are physiologic, such as calcium, magnesium, acids and the hormones; (2) the antispasmodic alkaloids, and (3) those acting reflexly or on the psychic centers. A local irritation in the viscus itself acts on the sensory nerve endings and by means of a reflex arc of variable length stimulates the motor element of the visceral spasm. One should always attempt to determine the underlying cause (sensory) of such a reflex arc. At times the spasm seems out of all proportion to the sensory cause, thus indicating an abnormal reactivity of the nervous system, as in asthma and spasmodic colitis. One is forced in some cases to ascribe the spasm to a veritable "diathesis" for which a sort of desensitization is necessary.

Ectopic Spleen with Torsion of Pedicle

At the July 10 meeting of the Société de chirurgie, Desplas reported the case of a woman, aged 23, with a negative previous history, who had sudden severe colicky abdominal pain accompanied by metrorrhagia. Bimanual vaginal examination revealed an oval, tender, mobile mass in the culdesac of Douglas, to the left of the median line. A diagnosis of twisted pedicle of an ovarian cyst was made and a laparotomy was performed. This revealed that the mass was a large spleen presenting a threefold torsion of its long pedicle. On removal, section of the spleen disclosed little evidence of interference with its blood supply. Just before this attack the patient had passed through an apparently normal pregnancy, but a slow engagement of the head had been noted during the first stage of labor. The torsion of the splenic pedicle began

six days before the operation. In spite of this prolonged anemia, no very marked changes were to be found in the parenchyma. In the discussion, a similar case was cited in which Pean had operated in 1867. Gregoire reported a case similar to the case of Desplas. Faure also added a case in a man, the spleen being found in the rectovesical pouch. In his case there was no torsion of the pedicle. Mondor stated that he had been able to find reports of six cases like that of Desplas. It was easy to make such a mistake in diagnosis, especially when the ectopic spleen was an accessory one.

BERLIN

(From Our Regular Correspondent)

Oct. 28, 1935.

The Discovery of Syphilis

A short time ago, Haberling, professor of the history of medicine in Düsseldorf, discussed the question of the discovery of syphilis. In the last decade of the fifteenth century, which is replete with significant historical events as is scarcely another decade in the world's history, syphilis as a distinct disease entity first attracted attention. Astrologic interpretations having called attention to a sexual plague that would spring up in this decade, all Germany, through the blasphemy edict that was promulgated at Worms, Aug. 7, 1495, became acquainted with the fact that a previously unknown disease called "die bösen Blattern," or virulent smallpox, had been sent down to earth as a punishment from heaven. In reality, as Haberling demonstrated, the disease was not new at that time but had been known for many years among the so-called wundärzte, by whom it was treated with mercury. Haberling also pointed out that, in spite of the comprehensive research of Sudhoff, the fable of the American origin of syphilis still bobs up even in studies apparently undertaken seriously. In Haberling's opinion, this fable is connected with the then growing trade in guaiacum wood, from which huge profits were realized. To strengthen the public faith in the efficacy of this wood, the absolutely groundless tales of the transmission of syphilis by the natives of Haiti to the sailors of Columbus were invented, a full generation after the discovery of America. Likewise the account of a devastating epidemic of syphilis in the vicinity of Naples and in German regions was a pure fabrication. Haberling pointed out also that, according to the researches of Sticker, along with the term "lepra vera," again and again one finds in the writings of the physicians of the middle ages the expression "lepra spuria," which, in contradistinction to lepra vera, did not require isolation and was curable. This lepra spuria, to which, in course of time, many other names were assigned, was doubtless syphilis, which, simultaneously with leprosy, was brought in from the Orient by persons returning from the crusades.

Sterile Marriages

In view of the attitude of the present German government in promoting an increase of the population, the question of sterile marriages is fraught with interest. Professor Eymer, ordinarius in gynecology at the University of Munich, who discussed this subject before the Munich Medical Society, stressed most emphatically that any attempt to discover the cause in a given case presupposes a careful examination of both partners even though the wife should present pronounced abnormalities.

Causes of marital sterility traceable to the wife may be based on anomalies of any of the many portions of the genital canal. In addition, there are general, and even psychic, causes of sterility. Of less importance are inflammations of the vulva, tumor formations of the labia majora and the labia minora, and a rigid hymen. Vaginism as a psychic reflex requires mental treatment. There is no doubt that retroflexion of the uterus may cause sterility. Considerable importance attaches to the observation that after long continued use of inserts and anticonceptional lavages, and also after induced abortion, sterility often intervenes. Nonpatency of the fallopian tube is an important factor from a purely numerical point of view. In bilateral closure of the tubes the prospects of successful treatment are very poor. Roentgen stimulative treatment is absolutely rejected by reason of the undesired effects often observed and because of possible injury to the germinal plasma. Sterility associated with disturbances of other endosecretory glands is always traceable to ovarian dysfunction accompanying these glandular disturbances. Of especial importance in this connection are the hypophyseal disorders. It is the opinion of Professor Eymer that occasionally the causes of sterility lie in the general mode of living or in the misuse of medicines and luxury articles (tobacco).

Reduction in Industrial Accidents

According to investigations instituted by Oberregierungsrat Wicke, a general reduction in the number of accidents to German workmen is observed. According to the figures published by the industrial unions, conditions over the period 1929-1934 were as shown in the adjacent table. This observation is the more surprising when one considers how many among those workmen recently put to work have, through enforced idleness, become disaccustomed to work. Wicke holds that this reduction in the number of accidents is ascribable particularly to the indefatigable accident prevention campaign that has been waged in recent years. In the building trades it has been established that, in 1932, 7.87 per thousand full-time workmen suffered their first compensated accident and that 0.55 of these accidents (per thousand workmen) proved fatal. In 1933 the corresponding figures were 5.19 and 0.43; in 1934, 4.80 and 0.45. In 1932 in underground operations 15.48 per thousand full-time workmen suffered their first compensated accident and 0.92 of these accidents (per thousand workmen) proved fatal. The corresponding figures for 1934 were 5.75 and 0.66. During the first seven months of 1935 there was a still further decrease in the number of accidents.

Industrial Accidents in Germany, 1929-1934

Year	Number of Registered Full-Time Workmen	Total Number of Workmen Compensated the First Time for Accident	Number of Compensated Accidents per Thousand Full-Time Workmen	Number of Fatal Accidents	
				Totals	Per Thousand Full-Time Workmen
1929	10,770,361	66,494	6.17	4,913	0.46
1930	9,984,123	61,965	6.21	4,476	0.45
1931	8,394,347	47,369	5.64	3,221	0.38
1932	7,158,279	27,672	3.87	2,311	0.32
1933	7,738,897	24,139	3.12	2,402	0.31
1934	9,413,493	24,394	3.13	2,317	0.25

Seventy-Fifth Anniversary of the Founding of the Berlin Medical Society

On October 31 the Berliner Medizinische Gesellschaft will celebrate its seventy-fifth anniversary. The society at its founding was an amalgamation of two societies, the Gesellschaft für wissenschaftliche Medicin and the Verein Berliner Aerzte. Its first president was the surgeon Langenbeck, who was succeeded by Graefe, Virchow, von Bergmann and many others whose names are well known. Since 1915 the society, in affiliation with the Deutsche Gesellschaft für Chirurgie, has had a new building of its own: the Langenbeck-Virchow-Haus. For many years the Berliner Medizinische Gesellschaft exerted an important influence over medicine in general, which was far beyond its local significance. In recent years, because of the disturbing political events, the attendance has fallen off considerably.

BUDAPEST

(From Our Regular Correspondent)

Nov. 1, 1935.

The International Dermatologic Congress at Budapest

The work of Prof. Louis Nékám and the Hungarian organization committee stimulated great interest in the ninth International Dermatologic Congress, held in Budapest September 13-21. Of more than a thousand members assembled here, about eight hundred were foreigners. Official representatives were present from twenty-seven countries. Fifty-seven universities and more than sixty scientific societies and institutions sent delegates. The European universities, two universities of Argentina, three universities of the United States, and universities of Egypt, Japan and China sent official representatives.

The opening of the congress took place in the magnificent cupola hall of the parliament building in the presence of a huge audience including representatives of the Hungarian government. The opening address was made by Professor Nékám. Professor Zieler of Würzburg greeted the congress on behalf of all nations. After the opening speeches the board of the Budapest Pázmany Péter University of Sciences awarded to Prof. Jean Darier of Paris, president of the International Dermatologic League, an honorary diploma. M. Horthy, regent of Hungary, received the members of the congress at 5 o'clock tea in the royal castle, while in the evening the government received the members in the gala hall of the ministry of internal affairs.

The scientific work began next day. The international permanent committee of eleven met under the presidency of Professor Darier and resolved to reduce the membership fee of the International Dermatologic League to 25 Swiss centimes annually. The permanent committee has been supplemented by new members: Lesczinsky of Lemberg, Arzt of Vienna, Zieler of Würzburg and Harold N. Cole of Cleveland. The committee reported that the Spanish government had sent an invitation to hold the next congress in Madrid, which the congress unanimously accepted.

Under the presidency of Rille of Leipzig the terminology committee resolved to preserve the old classic etiologic denominations and if this is not feasible, the pathogenesis should be reflected in the terms used.

The classification committee under the presidency of Howard Fox of New York set as an aim a grouping of diseases on an etiologic and pathologic basis. The committee agreed to observe three points of view in the matter of classification: clinical symptoms, tissue anomalies and etiology.

Under the presidency of Gougerot of Paris the reform of teaching was discussed. It was agreed that dermatology should be given at the universities four hours a week, while specialty training should require three years of special study, with at least one of the years spent in a university clinic. The exchange of assistants and special dermatologic graduate courses for qualified dermatologists were suggested.

Under the presidency of Graham Little of London a committee discussed questions of practice. It objected to further socialization of medicine. The committee considered the compulsory notification of venereal diseases and professional secrecy, which, it decided, should be defended unless its breach is required by the law.

A committee under the presidency of Tomassi of Palermo resolved that a new institution, the international exchange center, should be established. For five years the seat of this will be the dermatologic clinic of Budapest. The purpose of this exchange center is to supply institutes and also private physicians with scientific and analytical material the acquisition of which is difficult. There will be exchange of microscopic preparations, bacterial cultures, vaccines, photographs and reprints. The center will forward leaflets on scientific subjects to its members. The idea was received with enthusiastic approval. The scientific subjects discussed concerned venereal diseases, skin tuberculosis, diseases conveyed to men from animals, medical examination before marriage, sex education and antivenereal institutes. Also therapeutic methods and preventive measures were discussed, and the compulsory examination of grammar school children, suggested by Professor Neuber of Debreczin, was approved.

At the conference on skin tuberculosis, under the presidency of Lomholt of Hague, it was resolved to collect statistics on lupus patients and to establish lupus homes, and to study the social conditions of lupus patients, and methods by which poor patients can be adequately treated and placed in institutes where they can carry on some occupation. It was deemed desirable that an international lupus home should be organized. To carry out this plan a special committee was appointed.

The president of the conference dealing with industrial skin diseases was Oppenheim of Vienna. The conference dealt with the compilation of a list of poisons, clinical instruction on industrial diseases, and the problems of insurance and indemnity.

The conference on comparative dermatology, cooperated with veterinary surgeons under the presidency of Marek of Budapest, discussing diseases of animal origin—erysipeloid, bird tuberculosis, foot and mouth disease, anthrax, malleus, brucellosis, tularemia, and fungous diseases of animal origin. Gottron of Berlin read a paper on the bacteriology and epidemiology of erysipeloid. Balogh exhibited histologic slides of eight cases of glanders observed by him.

The scientific papers were presented in four spacious halls of the Redout. Professor Darier outlined the fifty years of the development of dermatology, through the morphologic, etiologic and biologic development stages. Sabouraud of Paris summarized the development of mycology. Riecke of Göttingen discussed the relation of dermatology to the general medical sciences. In the symposium on the functions of the skin, the speaker dwelt on the skin as a defensive organ. Darier, Civatte and Tzank of Paris stated that in case of external influences the skin reacts either defensively or passively: it takes up the entering substance and assimilates it (immunity) or defends itself with an inflammation (intolerance). Pasini of Milan discussed the temperature of the skin, abnormal dermographism and the influence of hemoglobin and porphyrin on skin processes. Milian of Paris discussed the dermatoses produced in connection with the defensive action of the skin. Hegler of Hamburg explained the connection between the skin and the internal organs in infectious diseases. Lesczinsky of Lemberg interpreted the connection between the skin and the sexual organs. Desaux of Paris called attention to the connection between the skin and the gastro-intestinal system. Brack of Basle emphasized the rôle of the vegetative system in the origin of itching.

In the symposium on allergy, Stühmer of Freiburg dealt with allergy in syphilitic cases. W. Jadassohn of Zurich made known the mechanism of allergic testing. Geber of Budapest described a method of desensitization. Mouriquand-Gaté of Lyons discussed the importance of metabolic disturbances in the causation of skin diseases. Spillmann of Nancy explained the rôle of the endocrine glands in the origin of skin diseases.

In the symposium on skin diseases produced by external causes, Sir Graham Little sketched the English conditions, reading statistics on chemical and other substances causing skin disorders. Brill of Rostock called attention to the importance of climate, race and geographic position.

In the symposium on filtrable viruses, variola, varicella, tuberculosis, herpes and papilloma were discussed. Balogh of Budapest reported the results of extensive investigations of cases of varicella and found pathologic changes in the spinal ganglions, which he regards as histologic group reactions. Favre-Gaté of Lyons stated that it is probable that the bacillus of tuberculosis possesses also an ultravirus form. Baló of Budapest discussed the etiology of senile warts and papillomas, which he believes

are caused by filtrable viruses. Urbach of Vienna gave an account of his experiments on pemphigus, which he believes is caused by a filtrable virus. Several members of the congress took a different view.

In the symposium on the pathology of tuberculosis, Lange of Berlin pointed out that the theories with regard to the developmental cycles and filtrable forms of the tubercle bacillus have not been sufficiently confirmed. Gougerot of Paris read a paper on the local action of the tubercle bacillus, the tuberculids, the local defenses of the skin and the rôle of antibodies formed in the skin.

In the symposium on syphilis, Mulzer of Hamburg read a paper on the nonspecific treatment of syphilis. Cole of Cleveland and his fellow dermatologists reported experiences gained in five American clinics. An examination of 6,253 cases of late syphilis was made to ascertain how far antisyphilitic treatment is apt to check the evolution of cardiovascular and central nervous system manifestations. Pinard of Paris reviewed the literature on malaria and fever therapy. The same topic was the subject of a paper by Arzt of Vienna. Hilgermann read a treatise on the treatment of syphilis with vaccine prepared from inactivated spirochetes. The results as yet are not encouraging. Zieler of Würzburg summarized the criteria that determine the cure of syphilis.

Many papers were read on miscellaneous subjects. Von Berde of Szegedin stated that rat pellagra is not identical with human pellagra and that the latter is not caused by the lack of vitamin B but is a genuine infectious disease, which occurs only in association with some nutritional and digestive disturbance. Nicolau of Bucharest spoke on inguinal lymphogranulomatosis. Reiss of Shanghai read a paper on the tuberculoid form of lepra as observed in China. Pearce of New York made known his experiences with experimental syphilis. The number of papers presented in this group exceeded 400, of which fifty-six were read by Hungarians.

An interesting part of the scientific meetings was the demonstration of slides of microscopic preparations. Jame of Paris projected a film illustrating the treatment of gonorrhea in the French army. Györkovács of the French Congo presented a film on tropical skin diseases and the public health institutions of the Congo region. Schereschewsky of Paris demonstrated the morphology and motion of Spirochaeta pallida in experimental and human syphilis, together with its response to chemotherapy.

The scientific work was supplemented by a scientific exhibition. The historical section comprised the valuable library of the Budapest dermatologic clinic, including a great number of incunabula, codexes and collected edicts. Faludy's precious collection of medical plaquettes had many admirers; likewise the ancient atlases of the Parisian St. Louis Hospital, a collection of the photographs of prominent dermatologists, and old medical prescriptions. The Hungarian National Museum lent many objects, among them a collection of faience pots used in pharmacists' shops in the sixteenth, seventeenth and eighteenth centuries. Another section comprised the wax models of parasites causing skin diseases, moulages, several hundred histologic figures, insects, plants, wood substances causing skin disorders, cultures of bacteria pathogenic to the skin, and charts displaying the frequency of various skin diseases. Much interest was shown in the exhibition of fungi, compiled by Ballagi, the first to collect almost all varieties of fungi causing skin diseases. Cultures were exhibited from all parts of the globe, and keeping them alive was the duty of the Budapest dermatologic clinic. The transinoculated stocks stood at the disposal of all members of the congress. In fact, this was the first function of the central exchange. On the last day, 140 patients were exhibited.

During the congress a gala performance was given at the Royal Opera, members were entertained at an evening party in the Alpine village at a Budapest park, and a banquet was given at the Hotel Gellert.

Marriages

HOWARD Q. L. LITTLE, Gibsonville, N. C., to Miss Elizabeth Jordan of Smithfield at Kernersville, in September.

WILLIAM HUSTON TANKSLEY JR., Nashville, Tenn., to Miss Billie Barringer of Sumter, S. C., October 2.

FRANK KIMZEY JUSTICE, Clayton, Ga., to Miss Katherine S. Miller of Murphy, N. C., October 19.

SAMUEL WEISSROSS, Pocatello, Idaho, to Miss Evelyn Vera Mayer of Los Angeles, December 8.

WILLIAM H. KRAUSE, Windsor, Vt., to Miss Madeline Kelliher in Amenia, N. Y., October 10.

HAROLD T. LARSEN, Fort Dodge, Iowa, to Miss Katherine Kumpf of Los Angeles, October 7.

LOUIS SCHNEIDER, New York, to Miss Lillian Blass of Mount Vernon, N. Y., November 28.

MARTIN PATMOS, Kalamazoo, Mich., to Miss Alice Eleanor Brown of Detroit, June 7.

HAROLD E. O'NEAL, Tipton, Iowa, to Miss Elsie Maddox of Sedalia, Mo., October 13.

HOWARD G. BEATTY, Creston, Iowa, to Miss Helen Maneely of Afton, October 17.

Deaths

William Perry Northrup, New York; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1878; an Affiliate Fellow of the American Medical Association; instructor of Greek, Knox College, Galesburg, Ill., 1872-1876; adjunct professor of pediatrics, 1893-1896, professor, 1896-1919, and since 1919 emeritus professor of pediatrics, University and Bellevue Hospital Medical College; a founder and past president of the American Pediatric Society; for many years on the staff of the Presbyterian Hospital, New York Foundling Hospital, Willard Parker Hospital and the hospitals of the New York Health Department, the Babies' Hospital, Newark, N. J., and the State Orthopedic Hospital, West Haverstraw, N. Y.; also played an important part in Dr. O'Dwyer's development of the treatment of diphtheria by intubation; American editor of "Ashley and Wright's Diseases of Children" in 1900, and "Nothnagel's Encyclopedia of Practical Medicine," American edition, volume 4, in 1902; aged 84; died, November 20.

Charles Percy Noble, Radnor, Pa.; University of Maryland School of Medicine, Baltimore, 1884; at one time clinical professor of gynecology, Woman's Medical College of Pennsylvania, Philadelphia; at various times on the staffs of the Chester County Hospital, West Chester, Kensington Hospital for Women, Stetson Hospital, Philadelphia Lying-in-Charity Hospital and the Woman's Hospital, Philadelphia; co-editor with Howard A. Kelly and one of the authors of the "Kelly-Noble Gynecology and Abdominal Surgery" in two volumes; corresponding member of Die Gynäkologische Gesellschaft in München; aged 72; died, November 21.

Hugo Albert Kiefer ⊕ Los Angeles; University of Pennsylvania Department of Medicine, Philadelphia, 1897; formerly adjunct professor and assistant professor in ophthalmology, University of California Los Angeles Medical Department; member of the American Academy of Ophthalmology and Oto-Laryngology and the Pacific Coast Oto-Ophthalmological Society; fellow of the American College of Surgeons; on the visiting staff of the Hollywood Clara Barton Memorial Hospital; aged 65; died, October 26, in Cedars of Lebanon Hospital.

Thomas Herbert Bell, Winnipeg, Manit., Canada; Trinity Medical College, Toronto, Ont., 1896; M.R.C.S., England, and L.R.C.P., London, 1897; professor of ophthalmology, University of Manitoba Faculty of Medicine; fellow of the American College of Surgeons; aged 63; on the staff of the Winnipeg General Hospital, where he died, November 28, of cerebral embolism and thrombosis of the right leg.

Dougal Bissell ⊕ New York; University of Maryland School of Medicine, Baltimore, 1888; member of the American Gynecological Society; one of the founders and fellow of the American College of Surgeons; past president of the New York Obstetrical Society; surgeon to the Woman's Hospital, 1910-1929; aged 71; died, December 3, of cerebral hemorrhage.

Joseph Albert McGuire, Norton, Va.; University of Virginia Department of Medicine, Charlottesville, 1900; member of the Medical Society of Virginia; past president of the Wise

County Medical Society; member of the state board of health; formerly medical director of the Norton Hospital; aged 59; died, October 25, of cerebral hemorrhage.

William Hardick Wells ⊕ Riverside, Calif.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1901; formerly health officer of Riverside City and Riverside County and secretary of the Health Officers' Section of the League of California Municipalities; aged 60; died, November 1.

Richard Root Rupert, South Bend, Ind.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1912; member of the American Association of Anatomists; ship surgeon to the steamship *American Trader;* aged 53; died, October 16, of cerebral hemorrhage, while in England.

Warren Lynnford Duffield ⊕ Brooklyn; Long Island College Hospital, Brooklyn, 1898; fellow of the American College of Surgeons; senior surgeon to St. John's Hospital, consulting surgeon to the Methodist Episcopal Church Home, Brooklyn, and the Southside Hospital, Bayshore; aged 60; died, November 21.

Emmett Patrick Whalen, Indiana, Pa.; St. Louis University School of Medicine, 1932; member of the Medical Society of the State of Pennsylvania; aged 28; on the staff of the Indiana Hospital, where he died, November 8, of peritonitis, following a perforated gastric ulcer.

Daniel Thompson Boger, Monroe, N. C.; North Carolina Medical College, Davidson, 1906; member of the Medical Society of the State of North Carolina; president of the Union County Medical Society; aged 67; died, December 2, in a hospital at Charlotte.

Samuel Mitchell Wagaman, Hagerstown, Md.; University of Pennsylvania Department of Medicine, Philadelphia, 1901; formerly county health officer; at one time on the staff of the Washington County Hospital; aged 62; died, November 8, of heart disease.

Ida Mary F. Alexander, Lansing, Mich.; University of Minnesota Medical School, Minneapolis, 1908; lecturer for the state health department on child and maternal hygiene; aged 58; was found dead in her automobile near Lake City, October 23.

James Joseph King ⊕ New York; University of Louisville (Ky.) Medical Department, 1907; member of the American Academy of Ophthalmology and Oto-Laryngology; formerly on the staff of the French Hospital; aged 53; died, November 29.

William Franklin Keller ⊕ Sioux Falls, S. D.; University of Nashville (Tenn.) Medical Department, 1897; served during the World War; for twenty years president of the city health department; state prison physician; aged 71; died in October.

Norvel William Jarvis, Festus, Mo.; St. Louis University School of Medicine, 1904; member of the Missouri State Medical Association; past president of the Jefferson County Medical Society; aged 55; died, October 23, of cerebral hemorrhage.

Charles Felice Tommasi, Newark, N. J.; Regia Università di Napoli Facoltà di Medicina e Chirurgia, Italy, 1899; member of the Medical Society of New Jersey; aged 67; died, October 29, of coronary thrombosis and bilateral pyonephrosis.

Ogilvia Curtis Ricksecker ⊕ Wilmot, Ohio; Ohio Medical University, Columbus, 1897; also a druggist; past president of the Stark County Medical Society; formerly county health officer; aged 60; died, October 22, of cerebral hemorrhage.

Harry Albert Bennett, Battle Creek, Mich.; Eclectic Medical College, Cincinnati, 1915; on the staff of the American Legion Hospital; aged 52; died, October 26, in the Leila Memorial Hospital, of teratoma of the testicle.

Oscar Edwin McHenry, Blue Creek, Ohio; Medical College of Ohio, Cincinnati, 1903; member of the Ohio State Medical Association; for many years member of the board of education; aged 68; died, October 26.

Archibald Carlton Weaver, Santa Monica, Calif.; Western Reserve University Medical Department, Cleveland, 1911; member of the California Medical Association; formerly police surgeon; aged 49; died, October 23.

George B. Gesner ⊕ Marshall, Mich.; Trinity Medical College, Toronto, Ont., Canada, 1899; for many years member of the board of education; on the staff of the Oaklawn Hospital; aged 64; died, October 27.

Joseph Leslie Pyle, Chester, W. Va., Keokuk (Iowa) Medical College, 1896; formerly mayor of Chester; at one time president of the Public Health Council; aged 68; died suddenly, October 23, of heart disease.

Henry Finlay Hyndman ⊕ Wichita, Kan.; University of Kansas School of Medicine, Kansas City, 1910; past president of the Sedgwick County Medical Society; aged 49; died, October 31, of diabetes mellitus.

Paul Williams Sweet ⊕ Centralia, Wash; Jefferson Medical College of Philadelphia, 1908; medical director of St. Luke's Hospital and Sweet Clinic; aged 56; died, October 22, of cerebral hemorrhage.

Cortes Holiday Wheeler, Portland, Ore.; Medical College of Ohio, Cincinnati, 1875; member of the Oregon State Medical Society; formerly health officer of Portland; aged 86; died, October 31.

Horace Clinton Whisler, Smithfield, W. Va.; University of the South Medical Department, Sewanee, Tenn., 1898; aged 76; died, October 14, in a hospital at Laurel, Md., of heart disease.

John Gordon McGuire, Chicago; Chicago College of Medicine and Surgery, 1911; also a minister; aged 62; died, November 30, in the Cook County Hospital, of cerebral hemorrhage.

Edward F. Beall, San Marcos, Texas; University of Louisiana Medical Department, New Orleans, 1883; member of the State Medical Association of Texas; aged 71; died, October 6.

William Abraham Berendsohn, Brooklyn; Long Island College Hospital, Brooklyn, 1889; member of the Medical Society of the State of New York; aged 67; died, October 7.

Thomas A. Cahill, Chicago; Chicago College of Medicine and Surgery, Medical Department of Valparaiso University, 1904; aged 56; died, September 8, of carcinoma of the lung.

Samuel Melvin Harpe, Calhoun, Ga.; University of Georgia Medical Department, Augusta, 1884; member of the Medical Association of Georgia; aged 72; died, October 27.

William Alexander Thomson Robertson, Ponca City, Okla.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1896; aged 66; died, October 26.

James Thomas Moon, Miami, Okla.; Eclectic Medical College, Cincinnati, 1922; member of the Oklahoma State Medical Association; aged 49; died, October 20.

John Edler Knipfel, Barkerville, B. C., Canada; University of Toronto Faculty of Medicine, 1905; aged 59; died, September 30, in Wells, of acute myocarditis.

John C. Swan, Marietta, Ohio; Jefferson Medical College of Philadelphia, 1876; aged 81; died, October 20, in the Marietta Memorial Hospital, of pneumonia.

Donald James Strohm, Audubon, N. J.; University of Pennsylvania School of Medicine, Philadelphia, 1931; aged 30; died, December 3, of encephalitis.

Harrison Morgan Brown ⊕ Pittsburgh; Western Pennsylvania Medical College, Pittsburgh, 1904; aged 61; died, October 25, of cerebral hemorrhage.

Charles Henry Glidden, Fort Pierce, Fla.; Hahnemann Medical College of Philadelphia, 1876; aged 82; died, November 21, of cardiorenal disease.

Orange H. Thomas, Fremont, Ohio; Medical College of Ohio, Cincinnati, 1882; for many years county health officer; aged 76; died, October 19.

Charles Edward Wingfield Jr., Athens, Ga.; Meharry Medical College, Nashville, Tenn., 1929; aged 31; died, October 28, in a local hospital.

Robert Clarke Boyle, Vancouver, B. C., Canada; Manitoba Medical College, Winnipeg, 1892; aged 66; died, November 18, of angina pectoris.

David Douglas Steiner, Quincy, Ill., College of Physicians and Surgeons, Keokuk, Iowa, 1886; aged 75; died, September 27, of cerebral hemorrhage.

Orizabor Burnett Fritch, Detroit; Michigan College of Medicine and Surgery, Detroit, 1904; aged 60; died, October 27, of heart disease.

Crawford Le Roi Thompson, Pittsburgh; Western Pennsylvania Medical College, Pittsburgh, 1896; aged 60; died, October 14.

John MacRae, Los Angeles; University of Pennsylvania Department of Medicine, Philadelphia, 1884; aged 73; died, October 15.

Jefferson D. Magee, Abilene, Texas; Louisville (Ky.) Medical College, 1886; aged 74; died, October 11, of lobar pneumonia.

Jennie Baker, Chicago; College of Medicine and Surgery, Chicago, 1908; aged 72; died, September 28, of cerebral hemorrhage.

Augustus Baton Kehrer, Philadelphia; Hahnemann Medical College of Philadelphia, 1880; aged 79; died, October 25.

James Beard, San Francisco; California Medical College, San Francisco, 1899; aged 77; died, October 1.

Bureau of Investigation

MISBRANDED "PATENT MEDICINES"

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

[EDITORIAL NOTE: The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the composition; (4) the type of nostrum; (5) the reason for the charge of misbranding and (6) the date of issuance of the Notice of Judgment—which may be considerably later than the date of the seizure of the product.]

Warm Springs Crystal Compound.—Warm Springs Crystal Sales Co., Warm Springs, Ga. Composition: Essentially Glauber's salt. For stomach disorders. Fraudulent therapeutic claims.—[*N. J. 22613; February, 1935.*]

Hayward's Preparation.—Hayward Remedy Co., Inc., New York. Composition: Essentially an iodide with alcohol and water. For asthma, hay fever and bronchial catarrh. Fraudulent therapeutic claims.—[*N. J. 22621; February, 1935.*]

Leonard's Mexica Barbed Wire Liniment.—Mrs. Harry Leonard, Hutchinson, Kan. Composition: Essentially kerosene, linseed oil and tar oil. For lung troubles, diphtheria, bronchitis, tonsillitis, etc. Fraudulent therapeutic claims.—[*N. J. 22633; February, 1935.*]

Pneumoseptin.—Virginia-Carolina Medical Co., Roanoke, Va. Composition: Essentially camphor, wintergreen, eucalyptol and lard. For congestion, inflammation, etc. Fraudulent therapeutic claims.—[*N. J. 22634; February, 1935.*]

Husband's Calcined Magnesia.—Husband's Magnesia Co., Inc., Philadelphia. Composition: Essentially magnesium oxide. For indigestion, dyspepsia, rheumatism, etc. Fraudulent therapeutic claims.—[*N. J. 22636; February, 1935.*]

Germol.—Paris Chemical Co., Huntingdon, Tenn. Composition: A dilute solution of hydrochloric acid in water, colored red. For stomach, liver and kidney troubles, etc. Fraudulent therapeutic claims.—[*N. J. 22637; February, 1935.*]

Georgia Crystal Compound.—Warm Springs Crystal Co., Warm Springs, Ga. Composition: Essentially Glauber's salt. For sour stomach, heartburn, hyperacidity, etc. Fraudulent therapeutic claims.—[*N. J. 22638; February, 1935.*]

Truth Brand White Pine Cough Syrup.—Blackstone Mfg. Co., Newark, N. J. Composition: Essentially chloroform, tar, sugar and water, with a small amount of inorganic salts. Fraudulent therapeutic claims.—[*N. J. 22641; February, 1935.*]

Echitone.—Strong, Cobb & Co., Cleveland. Composition: Essentially plant drug extracts, alcohol, sugar and water. For chronic eczema, ulcers, boils, etc. Fraudulent therapeutic claims.—[*N. J. 22642; February, 1935.*]

Cysto Sedative.—Strong, Cobb & Co., Cleveland. Composition: Essentially plant drug extracts, alcohol, sugar and water. For genito-urinary diseases. Fraudulent therapeutic claims.—[*N. J. 22642; February, 1935.*]

Kuhn's Ep-Sum-Pill.—H. Dale Kuhn Laboratory, Shelby, Ohio. Composition: In each pill, aloin, phenolphthalein (about ½ grain) and epsom salt (about 3 grains). For regulating bowels, for headaches, neuralgia, etc. Fraudulent therapeutic claims.—[*N. J. 22646; February, 1935.*]

Epsaline Tablets.—Gold Seal Products Co., Columbus, Ohio. Composition: In each tablet, aloin, phenolphthalein (about ⅖ grain) and epsom salt (7½ grains). Alleged tasteless and concentrated substitute for epsom salt. False therapeutic claims.—[*N. J. 22648; February, 1935.*]

Katropine Antiseptic Nasal Jelly.—Phoenix Drug Co., Newark, N. J. Composition: Chiefly benzocaine (3 per cent) and essential oils including menthol and camphor, incorporated in fat. For hay fever, catarrh, sinus infections, etc. Fraudulent therapeutic claims.—[*N. J. 22648; February, 1935.*]

Parker's Treatment for Indigestion and Constipation.—Parker Medicine Co., Cincinnati. Composition: Essentially baking soda (42 per cent), starch and ginger, peppermint-flavored. The Liver Tablets, which were part of the treatment, contained plant drug extracts including aloe and nux vomica. Fraudulent therapeutic claims.—[*N. J. 22653; February, 1935.*]

Female Re-Lax Lozenges.—H. Will Elders, St. Joseph, Mo. Composition: Plant drug extracts including a laxative, ginger and belladonna, podophyllin and a strychnine compound, coated with sugar and calcium carbonate and colored red. For laxative and tonic purposes. Fraudulent therapeutic claims.—[*N. J. 22655; February, 1935.*]

Steriltone.—H. Will Elders, St. Joseph, Mo. Composition: Essentially plant drug extracts including hydrastis and a laxative, with ferrous sulphate and arsenic trioxide. For sterility, etc. Fraudulent therapeutic claims.—[*N. J. 22655; February, 1935.*]

Servu Vaporizing Rub.—Service Laboratories, St. Louis. Composition: Essentially volatile oils such as wintergreen, camphor, menthol and eucalyptus, with turpentine, incorporated in petroleum and fat. For coughs, rheumatism, stiff neck, etc. Fraudulent therapeutic claims.—[*N. J. 22661; February, 1935.*]

Po-Da-Cro Bak-Ake Kidney and Bladder Pills.—Podacro Co., Inc., Morristown, Tenn. Composition: Juniper oil and methylene blue, coated with calcium carbonate. Fraudulent therapeutic claims.—[*N. J. 22662; February, 1935.*]

Buno Hair Medicine.—Buno Co., Inc., Philadelphia. Composition: Resorcin, brucine, perfume oils including bay, with alcohol, water, a small amount of a fatty oil, and yellow coloring. For dandruff, falling hair, eczema, etc. Fraudulent therapeutic claims.—[*N. J. 22664; February, 1935.*]

X-E-Ma.—X-E-Ma Co., Milwaukee. Composition: Essentially mercuric, chloride, glycerin and water, colored red. For skin disorders including eczema, psoriasis, itch, dandruff, etc. Fraudulent therapeutic claims.—[*N. J. 22666; February, 1935.*]

Pioneer Crystals.—Pioneer Crystal Co., Mineral Wells, Texas. Composition: Essentially dehydrated Glauber's salt (99.1 per cent) and a small amount of common salt. For Bright's disease, high blood pressure, arthritis, neuritis, etc. Fraudulent therapeutic claims.—[*N. J. 22668; February, 1935.*]

Dieto.—Kent Drug Co., Brooklyn. Composition: Partly dehydrated epsom salt, potassium sulphate, and common salt. For reducing weight, maintaining youth and preventing various diseases induced by overweight. Fraudulent therapeutic claims.—[*N. J. 22669; February, 1935.*]

Clifton's Brazolian Oil.—Clifton Drug Co., Girard, Ill. Composition: Essentially nitrobenzene and extract of red pepper, dissolved in gasoline. For toothache, rheumatism, deafness, swollen glands and limbs, etc. Fraudulent therapeutic claims.—[*N. J. 22670; February, 1935.*]

Clifton's Brazolian Herb Tablets.—Clifton Drug Co., Girard, Ill. Composition: Essentially ground plant drugs such as aloe, cascara sagrada, uva ursi, damiana and a pungent drug. For stomach, kidney and joint disorders, etc. Fraudulent therapeutic claims.—[*N. J. 22670; February, 1935.*]

Bon Vino Health Restorer.—Bon Vino Products, Inc., Buffalo. Composition: Essentially plant drug extracts including a laxative, with alcohol (about 20 per cent by volume) and water, mint-flavored. Misbranded because not made in Poland, as represented, and because alcohol content was incorrectly declared; misbranded, further, because of fraudulent therapeutic claims as a tonic, etc.—[*N. J. 22674; February, 1935.*]

Sanmetto.—Od Peacock Sultan Co., St. Louis. Composition: Plant drug extracts, alcohol and water. For genito-urinary disorders. Fraudulent therapeutic claims.—[*N. J. 22955; April, 1935.*]

R. M. B. Powders.—R. M. B. Laboratories, Inc., Seattle. Composition: Essentially bismuth subnitrate and sugar. For stomach disorders, including ulcers. Fraudulent therapeutic claims.—[*N. J. 22957; April, 1935.*]

Dismuke's Famous Mineral Crystals.—Famous Mineral Water Co., Mineral Wells, Texas. Composition: Essentially Glauber's salt, with small amounts of chlorides and magnesium compounds, such as epsom salt. For stomach trouble, rheumatism, autointoxication, etc. Fraudulent therapeutic claims.—[*N. J. 22956; April, 1935.*]

Peerless Crystals.—Peerless Mineral Water & Crystal Co., Mineral Wells, Texas. Composition: Essentially Glauber's salt, with small amounts of common salt and epsom salt. For rheumatism, gout, stomach, kidney and bowel troubles, etc. Fraudulent therapeutic claims.—[*N. J. 22958; April, 1935.*]

Nuxferrone.—John L. O'Bannon, Marissa, Ill. Composition: Essentially compounds of iron, manganese, calcium and potassium hypophosphites, quinine, peptone, extracts of plant drugs including nux vomica, and a laxative, with alcohol, water and aromatics. For debility, anemia, etc. Fraudulent therapeutic claims.—[*N. J. 22959; April, 1935.*]

Re-Cu-Ma.—Robinson Drug Co., Blytheville, Ark. Composition: Epsom salt, potassium iodide, plant drug extracts including licorice, aloe and podophyllum, with glycerin, alcohol (8.6 per cent by volume) and water, flavored with anise and sweetened with saccharin. "System purifier and tonic." Fraudulent therapeutic claims.—[*N. J. 22960; April, 1935.*]

Puratone.—John L. O'Bannon, Milan, Tenn. Composition: Essentially plant drug extracts including licorice, and a laxative such as cascara sagrada, with alcohol (7.9 per cent by volume), glycerin and water. For stomach, liver, kidney, bowel and blood disorders. Fraudulent therapeutic claims.—[*N. J. 22961; April, 1935.*]

Kal.—Makers of Kal, Los Angeles. Composition: Essentially powdered rice, cocoa and dicalcium phosphate. For mineral deficiencies in diet. Fraudulent therapeutic claims.—[*N. J. 22963; April, 1935.*]

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted on request.

ARTERIAL TENSION AND CARDIAC RESERVE

To the Editor:—What reliable and dependable authoritative part does blood pressure take in cardiac insufficiency? When the pulse pressure exceeds the diastolic pressure unless in aortic regurgitation, is it not evident that the cardiac reserve is low and that myocardial safety is at stake? Is it not proper to warn such a patient of his weakness and advise against taxing his heart muscle by any strain—even a physician's duty to urge complete rest until the patient's physical condition improves? Is not myocardial weakness the stepping stone to cardiac failure and often overlooked until conditions become so bad that prolonged rest—even heroic measures—must be resorted to in order that normality may be regained? Are not dyspnea on slight exertion, sleeping with the head elevated or even the stage of orthopnea, edema of the extremities and hypertension with or without valvular murmur or pain all evidences of deficient cardiac reserve or a weak heart? There are many tests for myocardial deficiency listed in the literature, but my experience has been that the "Barach" rule and "Strassburger" rule, both obtained by blood pressure readings, prove valuable adjuncts in diagnosis, the former to give the systolic-diastolic rate index and the latter showing the efficiency of the heart as a pump or the blood pressure coefficient. The latter is shown in the example cited at the beginning of this letter wherein I refer to the high pulse pressure exceeding the diastolic pressure, which would give over 50 per cent, which normally should be between 20 and 40 per cent. Below 20 or over 40 per cent is considered myocardial inefficiency. As some may not be familiar with the "Strassburger" rule, allow me to say that it is obtained by dividing the pulse pressure with two ciphers added by the systolic pressure and the result gives a percentage which should be within the limits mentioned (from 20 to 40 per cent). Posture and exercise tests also are coordinating proofs of heart efficiency, all of which taken with the general history, aided of course by the cardiogram when available, confirms the fact of normal or weak heart muscle. May I ask your valuable experience as to the foregoing being reliable in drawing conclusions about the condition of the heart muscle?

M.D., District of Columbia.

ANSWER.—The arterial tension is often a valuable guide to the status of the cardiac reserve. After all, it is primarily the cardiac force that maintains the arterial tension. Briefly, it may be said that the diastolic pressure is equivalent to the peripheral resistance to the circulation and that the systolic tension represents the cardiac force overcoming this resistance and propelling the blood. Therefore, ignoring for the time being such factors as pulse volume and circulatory velocity, one may consider the pulse pressure as an indirect index to the useful propulsive force of the heart. The arterial tension alone, however, does not tell the whole story and the pulse rate is of the greatest significance in evaluating the cardiac reserve as well as the results of physical examination.

The relationship of the pulse pressure to the diastolic pressure is not a fixed one and it is altered by a number of factors. For example, as the diastolic tension rises in hypertensive arterial disease the pulse pressure increases more rapidly, with a competent heart. Maintenance of the diastolic pressure is certainly dependent on competence of the aortic valves; in aortic regurgitation the pulse pressure is often extreme. Thyrotoxicosis, by increasing the cardiac output without much, if any, change in the peripheral resistance often results in a greatly increased pulse pressure. In these instances the diastolic tension is usually normal or slightly elevated, whereas in the former example of aortic regurgitation it is almost invariably much reduced. In thyrotoxic tachycardia the rise in pulse pressure is proportionate to the elevation of the basal metabolic rate and increased cardiac volume output. In acute myocardial failure it is usual that the systolic tension and pulse pressure are reduced, and such reduction is of ominous prognostic import. The pulse pressure may be considered a rough measure of the stroke volume, which is ordinarily reduced in cardiac exhaustion. However, myocardial inadequacy may be associated with dilatation of the ventricle of such a degree that relative aortic regurgitation results, with a consequent great increase in the pulse pressure. This increase is associated with a reduced diastolic tension. This exception to the general rule that with reduced myocardial strength the pulse pressure falls occurs most frequently in cases in which silent and asymptomatic calcification of the aortic valves has occurred, as described by Henry A. Christian (Aortic Stenosis with Calcification of the Cusps, THE JOURNAL, July 18, 1931, p. 158) and by H. M. Margolis, F. O. Ziellessen and A. R. Barnes (*Am. Heart J.* **6**:349 [Feb.] 1931).

The complaints and symptoms mentioned in the query are certainly evidences of reduced cardiac reserve and warrant the induction of rest. This is particularly the case if the pulse is rapid. Hypertension is mentioned as one of the evidences of cardiac disease. This is really putting the cart before the horse; cardiac disease is a consequence of hypertensive arterial disease and not vice versa. To evaluate fully the significance of the hypertension in such an instance, it is important to know not only the present levels but what the blood pressure was before the appearance of signs of myocardial inadequacy. The cardiac changes in hypertensive disease are divisible into three phases: (1) the sthenic stage, in which the heart is amply compensated, the pulse is slow and the pulse pressure is increased proportionately more than the diastolic tension, with a good response to exertion; (2) the asthenic stage, which appears insidiously in an almost imperceptible transition from the sthenic phases and which is characterized by an increasingly rapid pulse, a diminishing pulse pressure due to a fall in the systolic levels and the induction of dyspnea by lesser degrees of effort, and (3) frank myocardial decompensation, with its attendant fall in the systolic tension and the other well known signs of failure.

The two rules mentioned in the query are most useful as far as rules go. Clinical interpretation and correlation of all the facts available is essential. Rules and specific test procedures are not infrequently fallacious and misleading. Mackenzie emphasized years ago that the best criteria of the patient's cardiac reserve and cardiac efficiency were the data derived from careful study of a detailed history. Rather than rely on some one or two test procedures or formulas, it is wiser to evaluate the situation from as many sources of information as possible. Perhaps the most significant single observation is the ease with which dyspnea is induced by effort: as compensation and reserve strength diminish, dyspnea appears with less and less exertion. The degree of dyspnea per se is less important than the extent of effort required to induce it. This aspect of the situation is best illuminated by careful inquiry into the history; the patient can thus report the effect of changes in weather (such as a cold wind), the effects of digestion, and other occurrences on his circulatory efficiency.

One must not ignore the fact that all evidences of circulatory embarrassment are considerably aggravated by coincident anemia. In fact, most of the phenomena associated with reduction of the cardiac reserve can be brought about by profound anemia; even relatively minor depression of the oxygen carrying capacity of the blood enhances the intensity of symptoms. In the present instance, examination of the blood and of the renal functional reserve and determination of the basal metabolic rate are indicated before final conclusions regarding the extent of purely cardiac damage are warranted.

USE OF WHOOPING COUGH VACCINE

To the Editor:—In the October issue of *Parents' Magazine*, page 80, Dr. Emelyn Lincoln Coolidge in an article entitled "Safety via Vaccines and Serums" states that the Sauer vaccine for protection from whooping cough "must not be used for at least four months after any other vaccine or serum has been given." Is this correct? Why? Please omit name.

M.D., New York.

ANSWER.—Because whooping cough is more prevalent than diphtheria, smallpox or scarlet fever and is serious only during the first few years of life, it is advisable to immunize early. As the earliest age at which infants can develop immunity from the injection of the authorized vaccine has not yet been determined, it is best to give the injections during the second half year of life—preferably at about 7 or 8 months. Because a period of several months must elapse before the resulting immunity is complete, other immunization or vaccinations should not be attempted within that time.

It is rarely if ever necessary to crowd the various immunization procedures. A recent three year summary of results with a total of 8 cc. of the authorized vaccine for immunization shows that about 90 per cent of the children less than 3 years of age at the time of injection were protected when exposed to the disease from four months to three years after injection. Because failures occurred somewhat more often in children over 3 years of age at the time of injection, a total of 10 cc. is now recommended for all children beyond that age. If another immunization has already been performed, sufficient time for immunity to develop from it should elapse before the pertussis vaccine is given.

A practical immunization schedule, used by some physicians for several years, is to vaccinate first against whooping cough at 7 to 8 months; then a single diphtheria toxoid, alum precipitated, injection against diphtheria at 11 to 12 months; when the Schick test reading is made from four to six months later and found negative, the smallpox vaccination or scarlet fever immunization may be performed. By this plan all four immunizations can be completed relatively early in life without one conflicting with the other.

ROUTINE VISUAL TESTS IN SCHOOLS

To the Editor:—During the routine examination of the eyes in school examinations, what standard or test should be followed in rural schools? What percentage of defect should be present to demand correction immediately or soon? It doesn't seem practical to go through a complicated and detailed ophthalmologic examination in rural communities. Various eye charts for vision test are confusing, some having distances and percentages on the same chart. What would you suggest as a brief, reliable test for rural use? Omit name, please.

M.D., New York.

ANSWER.—The only satisfactory routine measurement of visual acuity in school examinations is by means of the standard Snellen chart. For this, a testing distance of 20 feet is essential. Illumination must be adequate, at least 7 to 10 foot candles and preferably artificial illumination. Probably the most satisfactory chart is the Snellen chart, published by the American Medical Association, containing notations of visual acuity and percentages of visual efficiency.

It is difficult to state empirically exactly what decrease in visual acuity necessitates further examination. That depends on the age of the child and the character and extent of the error of refraction that is present. When the error is small, visual acuity of 20/30 or even 20/40 may not necessitate correction. But if the error of refraction is great, particularly in a case of high hyperopia, even 20/25 requires further investigation. For routine purposes, one may say that visual acuity of 20/30 or worse in either eye should be the basis for refraction under mydriasis.

RELATIONSHIP BETWEEN LEUKEMIA AND CARCINOMA

To the Editor:—Are the lymphocytes seen about carcinomatous infiltrations an irritative or an inadequate defense mechanism? Has blood taken from a patient or animal with lymphatic leukemia ever been transfused into a normal person or animal to determine what effect it might have? In other words, could it possibly be transmissible in this manner? Likewise, has blood from a patient with lymphatic leukemia ever been used in a patient suffering from carcinoma? It has seemed to me logical to assume on a theoretical basis that, if the lymphatic infiltration so frequently seen about carcinomatous tissue is an inadequate defense, an added number of lymphocytes, a good source of which would be from a patient suffering from lymphatic leukemia, might be of value. I understand that many of the cells (lymphocytes) when found in large numbers are immature and for this reason may not possess the "antitoxic" properties.

M.D., Michigan.

ANSWER.—It is assumed, at least by some, that the accumulation of lymphocytes by carcinomatous infiltration may have defensive effects. In animals, notably fowls and mice, various forms of leukemia are readily transmissible by injection of blood or cells. So far as known there is no recorded instance of the injection of blood from a patient with lymphatic leukemia into a patient suffering from carcinoma. Naturally, one would hesitate to make such an injection because of the possibility of thereby transferring leukemia.

UTERINE FIBROIDS NOT RELATED TO THICKENING OF SKULL

To the Editor:—A married woman has a thickening of the inner table of the skull, associated with uterine fibroids. So far her mentality is normal, but she has some headaches and dysfunction of the right arm and both legs. May I ask for a frank discussion of the treatment you would advocate and the prognosis.

M.D., Illinois.

ANSWER.—The uterine fibroids are not responsible for the thickening of the skull, the headaches, or disturbed function of the right arm. Pressure, or venous engorgement associated with fibroids, might produce disturbances of the lower extremities, although it is uncommon in the absence of a complicating malignant condition or pelvic infection.

TOXIC EFFECTS OF EMETINE

To the Editor:—I have been using emetine in standard 6 cc. ampules for the relief of stomach ulcer or duodenal ulcer. Recently one patient complained of weakness of the limbs, resulting from this medication. As this is the first complaint, I wondered what you might know about the toxic effect of emetine.

M.D., New Mexico.

ANSWER.—Muscular weakness is a prominent symptom of emetine poisoning. Such weakness may be due to direct action of the emetine on the muscles, to depression of the heart muscle, to collapse from excessive loss of fluid, to neuritis, or to combinations of these. Excessively rapid intravenous injection may result in direct depression or paralyses of the heart, with no other symptoms than sudden weakness, fainting and even fatal collapse. In more slowly developing cases the vomiting and purging contribute to the collapse by inducing hypohydration. It is a peculiarity of poisoning by emetine that, even following a single dose, severe symptoms and even death may be delayed a long time. It may occur as long as a week later. When peripheral neuritis sets in it may prove fatal, especially in children and weak persons, in spite of interruption of the treatment at the onset of the neuritis.

BLEEDING AFTER INCISION OF VULVA IN PREGNANCY

To the Editor:—I was recently called to see an 18 year old primipara within a few weeks of term. There was a tender and painful swelling of the left labium majus, slightly fluctuating and rather edematous. I made an incision low down, about 1 cm. broad and nearly 2 cm. deep. There was a discharge of pus with a good deal of blood, which had ceased by the time I left. An hour later she began to bleed in spurts and was taken to a hospital. The bleeding was checked and a day or so later another incision was made. The discharge has stopped by this time. What did I do that was wrong?

M.D., California.

ANSWER.—The painful swelling was probably a Bartholin gland abscess. The vulva is often highly vascular in the advanced months of pregnancy and a transverse incision might cause free bleeding. The usual practice is to incise longitudinally, not transversely, thereupon spreading the wound with forceps to insure good drainage.

GLOMUS TUMORS

To the Editor:—In THE JOURNAL, September 7, Dean Lewis reported a series of glomus tumors that had come under his observation. In view of the fact that I am unable to find a definition of the glomus in any medical dictionary I have, will you please define the word and specifically locate it? Dr. Lewis mentions removal of these tumors. Will you kindly outline the technic, stressing necessary points of danger or trouble in their removal.

M.D., Florida.

ANSWER.—Glomus is derived from the Latin meaning ball and usually refers to a plexus of vessels. The word glomerulus used in the histology of the kidney is a diminutive of glomus and refers to a coil of blood vessels. Luschka in 1860 applied the term glomus coccygeum to a small organ situated near the tip of the coccyx. In applying the term glomus to the arterial angioneuromyomas, the resemblance of these tumors histologically to the glomus coccygeum of Luschka is emphasized.

Webster's dictionary gives the definition and use of glomus. These tumors can be removed under local anesthesia without any difficulty, and no danger or trouble should be experienced in their removal.

CONSTITUENTS OF THE NEURON

To the Editor:—I should like to know the chemical constitution of the fluid contained within the cell body of the neuron.

R. F. SHEETS, M.D., Carthage, Ill.

ANSWER.—The "cell body" of the neuron consists of the semifluid sticky gel called protoplasm. This is fundamentally the same in all cells. Since nerve cells have not been separated from other elements of nervous tissue for chemical study, it is not known specifically how their protoplasm differs from that of other cells. There are evidences that they are exceptionally rich in nucleoproteins. For a consideration of the great number of substances that have been separated from dead protoplasm, a textbook of physiologic chemistry must be consulted. The characteristic activities of any type of cell are the results of the cooperation of the various "organs" within the cell. These differ from one another both physically and chemically.

VEHICLE FOR PRESCRIBING BROMIDES

To the Editor:—I have been trying in vain to prescribe bromides in U. S. P. and N. F. vehicles that would be as pleasant as the proprietary preparations put out by various pharmaceutical houses. I shall appreciate it if you will inform me of a vehicle that will compare favorably.

WILLIAM STEINBERG, M.D., Philadelphia.

ANSWER.—A comparative study of vehicles has shown that the syrup of glycyrrhiza is one of the best disguising vehicles for bromides. Its colloidality suppresses the salty taste to a considerable degree. The immediately perceived sweetness of the sucrose and the lingering sweetness of the glycyrrhizin add further disguising value. Flavoring the syrup with anise or an anise bouquet is advisable. This may be done by using anise water as the solvent for the bromide, since the syrup is too concentrated to dissolve a full dose of this salt. The following prescription may serve as an example:

℞	Sodium bromide	30.0 Gm.
	Anise water	30.0 cc.
	Syrup of glycyrrhiza to make	120.0 cc.

Mix and Label: Teaspoonful in glassful of milk, after meals and at bedtime.

GLYCOSURIA

To the Editor:—In Queries and Minor Notes in THE JOURNAL, October 12, page 1210, the following statement appears: "Glycosuria excreting 20 mg. per hundred cubic centimeters of urine should cause rejection for employment or at least comprehensive study." In Quantitative Clinical Chemistry by Peters and Van Slyke, 1932, page 131, the excretion of dextrose in normal urine is said to occur in concentrations of from 0.02 to 0.10 per cent. What method for dextrose determination was considered in presenting your figure?

E. S. WILLIAMS, M.D., Richmond, Va.

ANSWER.—The statement should read "Glycosuria exceeding 200 mg. (or 0.2 per cent) per hundred cubic centimeters of urine should cause rejection for employment or, at least, comprehensive study." The statement that 20 mg. per hundred cubic centimeters of urine should so disqualify an applicant is incorrect, owing to clerical or stenographic error. The method of dextrose determination employed is the trinitrophenol method of Benedict.

ISOTONIC SALT SOLUTIONS BY HYPODERMOCLYSIS

To the Editor:—I am interested in learning about the effect of giving physiologic solution of sodium chloride and 5 per cent salt solution by hypodermoclysis. I have been unable to find any literature pertaining to this. Should 5 per cent sodium chloride ever be given subcutaneously? What factors other than injection, too rapid flow and too warm solution might account for a slough of the soft tissues if physiologic solution of sodium chloride should be administered?

JOSEPH O. HAWKINS, M.D., San Rafael, Calif.

ANSWER.—Only isotonic solutions should be used for subcutaneous injection. A solution containing 5 per cent of sodium chloride is too concentrated. It produces inflammatory reaction and may even cause a slough. In addition to excessive heat of solution, excessive distention of tissues and infection either carried in from without or brought to the tissues through the circulation, extremely poor circulatory activity in the part injected may favor production of a slough.

BLOOD GROUPS IN TWINS

To the Editor:—One of male twins was murdered. The twin sister attempted to throw guilt on a third party by means of a cloth on which she put some of her own blood. The age of the twins was about 40. Is there enough similarity in blood typing at that age to make it appear that the blood may have come from the murdered twin brother?

M.D., Pennsylvania.

ANSWER.—In monovular (or identical) twins the blood groups are invariably the same. The twins described are of different sexes and are therefore biovular. Biovular twins resemble each other neither more nor less than ordinary siblings. Hence they may or may not have the same blood group, though they are more likely to have identical groups than two unrelated individuals. The age makes no difference, since the blood group properties are demonstrable at birth and remain unchanged throughout life.

TELEGONY

To the Editor:—A dog breeder informs me that, if a thoroughbred bitch is "raped" by a mongrel, the bitch is ruined as far as further breeding of thoroughbred pups is concerned. Pups following this, even though the bitch is covered by a thoroughbred, will show characteristics of the mongrel. If this is true, would the same apply to human beings? That is, if a Negro raped a white woman, who gave birth to a mulatto, and later she marries a white man, would their children be liable to have Negro characteristics? Please explain. M.D., Idaho.

ANSWER.—There is no scientific evidence for and considerable evidence against telegony, which is defined as an influence of a previous sire on offspring of a later sire.

ROENTGEN TREATMENT OF SINUSITIS

To the Editor:—Has roentgen treatment of frontal sinus disease been successful? How many treatments are given and for what length exposure are they employed? Are there any contraindications to the treatment? At what stage is treatment most efficacious? What is the efficacy of autogenous vaccine treatment in frontal sinus disease? Please omit name. M.D., Ohio.

ANSWER.—Although some writers have reported favorably on roentgen treatment in sinusitis, its use has not been generally accepted. Details regarding roentgen treatment in chronic cases are given in the following articles:

Butler, F. E., and Woolley, I. M.: Roentgen Therapy in Chronic Sinusitis, *West. J. Surg.* **40**: 379 (July) 1932.
Butler, F. E., and Woolley, I. M.: Roentgen Therapy in Chronic Sinusitis: A Further Report, *Radiology* **23**: 528 (Nov.) 1934.

GONORRHEAL ARTHRITIS AND INFECTED PROSTATE

To the Editor:—Kindly inform me as to whether or not the existence of gonorrheal arthritis implies necessarily an infected prostate.

M.D., California.

ANSWER.—Gonorrheal arthritis occurs not infrequently as a complication of acute gonorrheal urethritis without any demonstrable prostatic involvement. Occasionally gonorrheal arthritis may be diagnosed conclusively by demonstrating the organisms in fluid aspirated from the joint, although careful examination does not reveal any local genital, urethral or prostatic infection. Gonorrheal arthritis is much more common secondary to gonorrhea in the male than in the female, but it may follow simple vulvovaginitis or ophthalmia neonatorum.

EFFECT OF SYPHILIS ON HEALING OF FRACTURES

To the Editor:—I would appreciate information concerning the rôle of syphilis in the healing of fractures. Is it the modern belief that secondary or tertiary syphilis retards the healing or union of fractures? I have to appear in court next week so would appreciate an early reply. Please omit name. M.D., Pennsylvania.

ANSWER.—The modern belief is that syphilis does not retard the uniting of fractures. Nonunion is seen most frequently in fractures of the neck of the femur, in the humerus and in the tibia. The records of the larger clinics show few cases of coexisting syphilis.

Council on Medical Education and Hospitals

ADDITIONAL HOSPITALS APPROVED

The Council on Medical Education and Hospitals of the American Medical Association has given its approval to the following hospitals since the publication of the last previous list in THE JOURNAL, July 6:

Hospitals Approved for Intern Training

Wesson Memorial Hospital, Springfield, Mass.
St. Joseph Mercy Hospital, Pontiac, Mich.
St. Agnes Hospital, White Plains, N. Y.
Evangelical Lutheran Hospital, Cleveland.
Good Samaritan Hospital, Dayton, Ohio.
St. Joseph's Hospital, Lancaster, Pa.

Hospitals Reinstated to Approved Internship List

St. Mary's Hospital, San Francisco.
St. Elizabeth Hospital, Chicago.
St. Anthony's Hospital, Rockford, Ill.
St. Luke's Methodist Hospital, Cedar Rapids, Iowa.
Flushing Hospital and Dispensary, Flushing, N. Y.
St. Mary's Hospital, Cincinnati.
Mount Carmel Hospital, Columbus, Ohio.
St. Luke's Hospital, Milwaukee.

Hospitals Approved for Residencies in Specialties

California Babies Hospital, Los Angeles. Pediatrics.
San Diego County General Hospital, San Diego, Calif. Medicine, ophthalmology-otolaryngology and surgery.
Peoria Municipal Tuberculosis Sanitarium, Peoria, Ill. Tuberculosis.
James Lawrence Kernan Hospital, Baltimore. Orthopedics.
St. Mary's Hospital, Kansas City, Mo. Surgery.
Mary Hitchcok Memorial Hospital, Hanover, N. H. Pathology.
United States Marine Hospital, Fort Stanton, N. M. Tuberculosis.
Beth Israel Hospital, New York City. Radiology.
Longview State Hospital, Cincinnati. Psychiatry.
St. Vincent's Hospital, Portland, Ore. Pathology.
Abington Memorial Hospital, Abington, Pa. Medicine, pathology and surgery.
Germantown Dispensary and Hospital, Philadelphia. Medicine and surgery.
Skin and Cancer Hospital, Philadelphia. Dermatology.

Hospitals Approved for Additional Residencies

Children's Hospital, Los Angeles. Pathology.
San Francisco Hospital, San Francisco. Orthopedics, thoracic surgery, tuberculosis and urology.
Stanford University Hospitals, San Francisco. Physical therapy.
University of California Hospital, San Francisco. Neurosurgery and urology.
Research and Educational Hospital, Chicago. Ophthalmology and radiology.
University of Chicago Clinics, Chicago. Anesthesia, neurology and psychiatry.
Evanston Hospital, Evanston, Ill. Surgery.
Methodist Episcopal Hospital, Indianapolis. Radiology.
St. Mary's Group of Hospitals, St. Louis. Ophthalmology and otolaryngology.
Jewish Hospital, Brooklyn. Pathology.
Millard Fillmore Hospital, Buffalo. Pathology.
Metropolitan Hospital, New York City. Pathology.
New York Post-Graduate Medical School and Hospital, New York City. Dermatology.
Jewish Hospital, Cincinnati. Radiology.
Memphis General Hospital, Memphis, Tenn. Pediatrics.

Medical Examinations and Licensure

COMING EXAMINATIONS

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Written examination for Group B applicants* will be held in various cities throughout the country, March 14. *Oral examination for Group A and B applicants* will be held in Kansas City, Mo., May 11-12. *Applications for written examination should be filed with the secretary before Jan. 15.* Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Written examination and review of case histories of Group B applicants will be held in various cities of the United States and Canada, March 28. *Applications must be filed not later than February 28.* Oral, clinical and pathological examination of all candidates will be held in Kansas City, Mo., May 11-12. *Applications must be received not later than April 1.* Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF OPHTHALMOLOGY: Kansas City, Mo., May 11 and New York, Oct. *All applications and case reports must be filed sixty days before date of examination.* Asst. Sec., Dr. Thomas D. Allen, 122 S. Michigan Ave., Chicago.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: St. Louis, Jan. 11. Sec., Dr. Fremont A. Chandler, 180 N. Michigan Ave., Chicago.

AMERICAN BOARD OF OTOLARYNGOLOGY: Kansas City, Mo., May 9. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PEDIATRICS: Kansas City, Mo., May 9. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, Dec. 30. Sec., Dr. Walter Freeman, 1726 Eye St., N. W., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: Kansas City, Mo., May 8-10. Sec., Dr. B. R. Kirklin, Mayo Clinic, Rochester, Minn.

CALIFORNIA: *Reciprocity.* San Francisco, Jan. 15. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

COLORADO: Denver, Jan. 7. Sec., Dr. Harvey W. Snyder, 422 State Office Bldg., Denver.

CONNECTICUT: *Basic Science.* New Haven, Feb. 8. *Prerequisite to license examination.* Address State Board of Healing Arts, 1895 Yale Station, New Haven.

DISTRICT OF COLUMBIA: Washington, Jan. 13-14. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

HAWAII: Honolulu, Jan. 13-16. Sec., Dr. James A. Morgan, 48 Young Bldg., Honolulu.

ILLINOIS: Chicago, Jan. 28-30. Superintendent of Registration, Department of Registration and Education, Mr. Homer J. Byrd, Springfield.

MINNESOTA: *Basic Science.* Minneapolis, Jan. 7-8. Sec., Dr. J. C. McKinley, 126 Millard Hall, University of Minnesota, Minneapolis. *Medical.* Minneapolis, Jan. 21-23. Sec., Dr. Julian F. Du Bois, 350 St. Peter St., St. Paul.

NATIONAL BOARD OF MEDICAL EXAMINERS. *Parts I and II.* Feb. 12-14, May 6-8, June 22-24, and Sept. 14-16. *Part III* tentatively scheduled as follows: Chicago, Jan. 7-9 and New York, Jan. 13-15. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

NEBRASKA: *Basic Science.* Omaha, Jan. 14-15. Dir., Bureau of Examining Boards, Mrs. Clark Perkins, State House, Lincoln.

NEVADA: *Reciprocity.* Carson City, Feb. 3. Sec., Dr. Edward E. Hamer, Carson City.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 27-30. Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, 315 Education Bldg., Albany.

NORTH DAKOTA: Grand Forks, Jan. 7-10. Sec., Dr. G. M. Williamson, 4½ S. 3d St., Grand Forks.

OREGON: Portland, Jan. 7-9. Sec., Dr. Joseph F. Wood, 509 Selling Bldg., Portland.

RHODE ISLAND: Providence, Jan. 2-3. Dir., Department of Public Health, Dr. Edward A. McLaughlin, 319 State Office Bldg., Providence.

SOUTH DAKOTA: Pierre, Jan. 21-22. Dir., Division of Medical Licensure, Dr. Park B. Jenkins, Pierre.

VERMONT: Burlington, Feb. 12. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

WASHINGTON: *Basic Science.* Seattle, Jan. 9-10. *Medical.* Seattle, Jan. 13-15. Dir., Department of Licenses, Mr. Harry C. Huse, Olympia.

WISCONSIN: Madison, Jan. 14-16. Sec., Dr. Robert E. Flynn, 410 Main St., La Crosse.

Oregon June Examination

Dr. Joseph F. Wood, secretary, Oregon State Board of Medical Examiners, reports the written examination held in Portland, June 18-20, 1935. The examination covered 11 subjects. An average of 75 per cent was required to pass. Thirty-eight candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists		(1935)	92, 92.3
Northwestern University Medical School		(1935)	87.2*
Creighton University School of Medicine		(1934)	88.5
University of Nebraska College of Medicine		(1933)	86.9
University of Oregon Medical School		(1934)	84.2, 84.8, 85.1, 85.2, 85.4, 85.8, 86.8, 87.2, 87.8, 88.4, (1935) 84.6,† 84.7,† 85.3,† 85.6, 85.9, 86.2,† 86.3, 87, 87.2, 87.3,† 87.5,† 87.5,† 87.5, 87.7, 87.8, 88.5,† 88.6, 88.8, 89.2, 89.4,† 89.7
University of Wisconsin Medical School		(1934)	86.1
University of Toronto Faculty of Medicine		(1934)	89.8

Five physicians were licensed by reciprocity and 1 physician was licensed by endorsement from June 19 through July 30. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
State University of Iowa College of Medicine		(1933)	Iowa
University of Kansas School of Medicine		(1930)	Kansas
University of Minnesota Medical School		(1928)	Minnesota
University of Oregon Medical School		(1933, 2)	California

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
University of Oregon Medical School		(1934)	N. B. M. Ex.

* This applicant has received an M.B. degree and will receive his M.D. degree on completion of internship. License has not been issued.
† License has not been issued.

Georgia October Examination

Mr. R. C. Coleman, joint-secretary, State Examining Boards, reports the written examination held by the State Board of Medical Examiners in Atlanta, Oct. 8-9, 1935. The examination covered 10 subjects and included 100 questions. An average of 80 per cent was required to pass. One candidate was examined and passed. The following school was represented:

School	PASSED	Year Grad.	Per Cent
Columbia Univ. College of Physicians and Surgeons		(1933)	87.4

Ten physicians were licensed by reciprocity from August 17 through November 9. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Arkansas School of Medicine		(1935)	Arkansas
Emory University School of Medicine		(1931)	Michigan
Tulane University of Louisiana School of Medicine		(1926)	Louisiana
University of Maryland School of Medicine and College of Physicians and Surgeons		(1920)	Maryland
University of Michigan Medical School		(1933)	Michigan
Medical College of the State of South Carolina		(1930)	S. Carolina
Meharry Medical College		(1934, 3)	Tennessee
University of Virginia Department of Medicine		(1934)	Virginia

Book Notices

Doctors and Juries: The Essentials of Medical Jurisprudence. By Humphreys Springstun. Fabrikoid. Price, $2. Pp. 155. Philadelphia: P. Blakiston's Son & Co., Inc., 1935.

The title of this volume is a misnomer. The book contains little information concerning juries and does not cover the essentials of medical jurisprudence. But its language is simple and its style easy; it is divided into numerous short chapters; it is printed in easily legible type, is bound in a flexible cover, is almost small enough to go into the coat pocket, and may well serve to aid a physician to pass away a few idle moments while waiting for something to turn up. Even so, the reader, unless he is already versed in legal medicine, must be on his guard lest he be misled. A lawyer or a physician seriously in need of aid will hardly find it in this volume, because the author has given no citations to support his statements.

The author's comments on the attire to be worn on the witness stand are novel, but they are practical and, corresponding as they do so closely with comment on the same subject by an English author (Kerr, D. A. J.: Forensic Medicine: A New Text-Book for Students and a Guide for the Practitioner, New York, Macmillan Company, 1935, p. 29) seem to be of sufficient interest to justify setting them out at length (pp. 94-95):

> Clothes may not make the man, but they sometimes undo him. Most men—that is most jurors—resent dudes and tailors' dummies; but they also dislike ostentatious raggedness. Showiness of apparel, whether of either extreme, is likely to militate against its wearer. At the same time there is a universal approval of being well dressed, as opposed to seeming either over-dressed or too slovenly. Ideal courtroom clothes are usually dark, of conservative weave and cut, and without ornamentation by way of accessories of haberdashery. Plain ties, plain shirts, inconspicuous appurtenances and appointments are least likely to arouse antagonism, and the general rule is that all articles of dress should be such that they have to be looked at twice before being seen or noted. In some communities spats, wing collars, stick pins, wrist watches, gloves, canes, stiff hats and lodge or fraternal emblems create no distrust and are unnoticed; in others they are as red flags to a bull, especially in regard to lodge buttons, emblems, rings and watch charms, for with the many divisions of race, religion and affiliations existing in most towns, it is unwise to display affiliation with any particular group and risk antagonizing an opposing group.

The author seems to be an earnest advocate of a policy advocated at times by physicians, under which a physician is not to testify against a fellow physician in support of a claim based on malpractice, even though the facts of the case are within

his own professional knowledge and he knows that the claim is just. The author contends (p. 136) that:

> It is far better that a negligent and careless physician escape liability for damages than that a whole community or locality should suffer because strict justice in such case is enforced. Confidence of patients in physicians is invaluable; and when this confidence is sapped by the publicity attendant upon malpractice suits, and, at the same time, the physicians in that district are made timorous thereby, the effect upon the public at large can be nothing but evil.

In support of his contention the author points out that indemnity companies have in some instances withdrawn from localities in which physicians have testified against fellow physicians, and he alleges (pp. 134-135) that, because of such withdrawal,

> the doctors tend to become overly cautious, their nerve is sapped and their judgment warped by fear, and the result is that the general public fails to receive the medical care and attention in that sort of locality that it receives in other localities where such unfortunate conditions do not exist.

Unfortunately the author does not state the facts on which he bases this allegation or the lines of demarcation that he draws between a physician's being normally cautious and "overly" cautious; or between a physician's "nerve" being normal and his "nerve" being "sapped"; and his judgment being sound or being "warped by fear." In the absence of such basic information a critic might suggest that the relative freedom from personal liability that a physician experiences when he carries malpractice indemnity insurance leads to carelessness, undue boldness and unsound judgment on his part and that the withdrawal of such insurance is not a detriment to either patient or physician but restores normal standards of care, courage and judgment.

A physician who has been regularly summoned as a witness in a malpractice suit cannot refuse to testify to facts within his own knowledge—unless by so doing he will incriminate himself—or to opinions based on those facts. But even if the rule were otherwise, physicians, it is believed, should hardly engage in a conspiracy to deprive patients who are in fact injured by the malpractice of their physicians, of the medical testimony necessary to support their claims and to obtain justice. Such a policy hardly appeals to one's sense of fair play, and if enforced it would tend to deprive physicians of a proper sense of responsibility and drive juries to appraise damages on the basis of the evidence of irregular practitioners and of laymen.

The protection of the public, the author seems to believe, does not depend on the existence of financial liability on the part of the physician for the consequences of his own carelessness, ignorance, unskilfulness and bad judgment but on the revocation of the licenses of physicians found deficient in professional care, knowledge, skill or judgment. Dishonorable and incompetent physicians should be deprived of their licenses, of course, but it is notoriously difficult to obtain evidence sufficient to accomplish that end, and but few patients would be likely to institute proceedings looking toward the revocation of their physician's licenses, even though the law permitted them to do so, so long as such patients could obtain no personal advantage by such action. This book is hardly one to be commended as a guide to medical students, physicians or lawyers.

Hormone des Ovariums und des Hypophysenvorderlappens: Untersuchungen zur Biologie und Klinik der weiblichen Genitalfunktion. Von Dr. Bernhard Zondek, Professor an der Hebräischen Universität, Jerusalem. Mit einem Anhang: Hormonale Schwangerschaftsreaktion; Hormon des Hypophysenzwischenlappens. Second edition. Paper. Price, 58 marks. Pp. 638, with 177 illustrations. Vienna: Julius Springer, 1935.

The second edition of this work, which first appeared in 1931 and has already become a classic, has been enlarged by the addition of fifteen chapters. It includes extensive discussions not only of experimental work but of technical methods and clinical applications, representing a synthesis of knowledge in one of the most fascinating fields of medical research, in which the author has played a significant part. Important information not available elsewhere and much that would be accessible only by diligent search of the literature appears in this volume. The typography is excellent and the many illustrations, a number of which are in color, are almost without exception well chosen, well executed and reproduced with unusual clarity. Extensive appendixes on pregnancy tests and on the chromatophorotropic hormone of the pars intermedia of the hypophysis are included.

Professor Zondek proposes in this edition a new nomenclature for the gonadotropic principles, taking into account differences in the effects of products from various sources not established at the time the original terms were suggested. Thus the gonadotropic principle of pregnancy urine remains "prolan," and the follicle stimulating and luteinizing factors, prolan A and B respectively; but the "synergistic" pituitary factor of Evans becomes "synprolan" and the gonadotropic complex of the pituitary (prolan plus synprolan) is designated "prosylan." This somewhat complicated terminology may be confusing to those not intimately acquainted with the work in this field; however, until chemically pure fractions are available the nomenclature will inevitably remain in a state of flux.

One minor flaw in an otherwise excellent book is the lack of uniformity in the bibliographic references, necessitating in many cases more searching than should be necessary.

The author, who is both a noted investigator and a practicing gynecologist, is co-discoverer, with Aschheim, of phenomena which they utilized as the almost infallible pregnancy test that bears their name. Their discoveries also led to the isolation from the urine of pregnant women of pure estrogenic compounds by Doisy, Butenandt, Marrian and others. The author and Aschheim share honors with Smith and Engle in this country for the discovery of the rôle of the hypophysis in the control of the genital system. These and numerous other important contributions provide an unusually sound and critical background for the material in this book, which will be an indispensable acquisition to the reference library both of investigators and of clinicians.

Dermatology and Syphilology for Nurses Including Social Hygiene. By John H. Stokes, M.D., Duhring Professor of Dermatology and Syphilology, the School of Medicine, University of Pennsylvania. Second edition. Cloth. Price, $2.75. Pp. 368, with illustrations. Philadelphia & London: W. B. Saunders Company, 1935.

This is a thoroughgoing revision of the well known textbook for nurses. General consideration of skin diseases, including all the common ones and some of the less common, comprises the first ninety-seven pages. Seventy-one pages are devoted to treatment of skin diseases, with detailed instructions in nursing care. Thirteen pages are devoted to gonorrhea for the purpose of emphasizing the differences between gonorrhea and syphilis. The next ninety-two pages consider syphilis and its treatment, with minute details for the nurse who assists in the treatment. The last forty-two pages are devoted to social hygiene, social service follow up, and the normal ideals of sex life. A three-page appendix gives pertinent bibliographic references, and a glossary occupies thirteen pages, giving accurate easily understood definitions of the terms used throughout the book. A complete index is appended. One could scarcely hope in a small book for a more excellent exposition of dermatology and syphilology for nurses.

Lehrbuch der Gastroskopie. Von Dr. med. Norbert Henning, Privatdozent an der Universität Leipzig. Boards. Price, 7.20 marks. Pp. 88, with 45 illustrations. Leipzig: Johann Ambrosius Barth, 1935.

According to Henning, a new textbook on gastroscopy became indispensable after the rapid spread of gastroscopy resulting from the invention of the flexible gastroscope. This instrument is now used in almost every large German hospital. The technical parts of former books on the subject had become obsolete. The work is based on several thousand gastroscopies; it is written only for gastroscopists. In spite of its brevity, one feels in each sentence the authority of an expert. Morawitz, director of the Medi[illegible] University Clinic of Leipzig and now editor of the *Archi[illegible]r Verdauungs-Krankheiten*, has written the preface, in which he says: "A certain reserve toward gastroscopy seemed to be comprehensible as long as there were only rigid instruments, but since gastroscopy has become safe today this hesitation is not justifiable any longer. . . . If it is known that in my hospital several thousands of gastroscopies have been carried out during the past eight years, frequently with valuable diagnostic results, it will be understood why I will not do without gastroscopy any longer. It probably will become a procedure which the gastro-enterologist must master just as the urologist must know cystoscopy." After remarks on the anatomy and physiology of the stomach and after a discussion of the development of the flexible gastro-

scope, Henning describes the modern instruments. He begins with the old rigid instrument of Schindler because he believes that the experienced examiner will often prefer it and because it allows photography by the use of Henning's gastrophotographic camera. The wisdom of discussing rigid instruments is questionable, since they have become obsolete following the invention of the flexible gastroscope. "Blind" gastrophotography is considered of no value. The flexible gastroscope is described in detail. The contraindications and especially the indications are discussed. Henning believes that soon treatment of stomach diseases without exact morphologic diagnosis by roentgen examination and especially by gastroscopy will be stigmatized as a serious mistake if not malpractice. The preparation of the patient and the introduction of the instrument are well described. Henning's opinion that the orientation in the stomach is easy will not be shared by expert teachers in gastroscopy. It is certainly significant that the description of gastroscopic pictures of gastritis takes twelve pages but of ulcer and tumor pictures only three pages. The importance of gastroscopy in the diagnosis of chronic gastritis is emphasized and reference is made to the author's more extensive monograph on the subject. The importance of gastroscopy in cases of ulcer and carcinoma is also pointed out. The comparison of gastroscopic observations with those of the x-ray relief method is of the greatest value. It is regrettable that only a few colored pictures are included in this most commendable book. Henning thinks that the variety of observations is too great to be shown in colored pictures. The beginner will miss nevertheless the multitude of pictures as shown in the old obsolete book of Schindler and in the new work of Moutier. The seven pictures of the three different types of gastritis, however, are excellent. This book should be read carefully by every gastroscopist.

Elementary Zoology for Medical Students. By L. A. Borradaile, Sc.D., Fellow and Tutor of Selwyn College, Cambridge. Third edition. Cloth. Price, $3.50. Pp. 429, with 285 illustrations. New York & London: Oxford University Press, 1935.

This edition contains additional material on the protozoa and on embryology. The book as a whole contains an account of invertebrates and vertebrates adapted to the needs of the premedical or medical student interested in acquiring a basic background in zoology. Aside from embryology and evolution, the principles of biology are touched on only in the accounts of the animals selected as representative types. The illustrations are numerous and carefully selected to augment the text. The work as a whole is a compact and condensed account of a few type animals selected because of their medical or evolutionary significance.

Sex Behavior in Marriage. By Charles A. Clinton, M.D. Cloth. Price, $2. Pp. 159, with 8 illustrations. New York: Pioneer Publications, Inc., 1935.

Here is another contribution to the innumerable books now available in this field. It is a brief, simple statement, not nearly so technical or even as well written as many of the other books now available. However, it will no doubt find a certain number of purchasers, as have all the other volumes now available in this field.

The Determination of Iodine in Biological Substances. By C. O. Harvey. Medical Research Council, Special Report Series, No. 201. Paper. Price, 1s. Pp. 43, with 3 illustrations. London: His Majesty's Stationery Office, 1935.

The significance of biologic iodine is widely appreciated. Consequently numerous analytic methods have been developed for its quantitative detection. Since it is usually minute in amount, these have long given varying results in the hands of different investigators. A standard method, so that data may be carefully compared, is certainly desirable. In this monograph the British Medical Research Council, after extensive investigations, presents its choice of an adequate micromethod. This is based on Hurtley's modification of the von Fellenberg procedure. The principles of this fundamental procedure, which has also been extensively developed in certain American laboratories, consist of (1) basic ashing in nickel crucibles, (2) alcoholic extraction of the iodide, and (3) titrimetric or colorimetric determination of the iodine. The author has thoroughly subjected the details of these principles to critical chemical analysis. As a result he presents a standardized von Fellenberg technic. This is still tedious and hardly yet adapted to the clinical laboratory. Nevertheless, it has yielded gratifying comparative results in the hands of competent analysts. It represents a more accurate research instrument for the investigation of iodine metabolism.

Medicolegal

Malpractice: Liability of Physicians for Anesthetizing a Minor Without Consent of Parents.—The plaintiff, 20 years of age, injured his ankle. He was taken to the defendant, a physician, for treatment, neither parent accompanying him. Without obtaining the consent of either parent, but with the minor's consent, the defendant anesthetized him with ether and proceeded to "set the ankle" and apply a cast. The plaintiff and his father subsequently sued the defendant in the city court of New York, Bronx County, to recover damages for alleged malpractice and for an assault predicated on the theory that the defendant anesthetized the plaintiff without obtaining the consent of his parents.

Where there is an emergency which endangers the life or health of a patient, or where suffering may be alleviated, said the court, it is a physician's duty to do that which the occasion demands within the usual and customary practice among physicians in the same locality. To hold that a physician must wait until he has obtained the consent of a minor's parents, who may not be available, before administering an anesthetic or before giving to an injured minor the benefit of his skill and learning to alleviate pain and suffering, might result in the loss of many lives and in much pain and suffering that might otherwise be prevented. Under the circumstances in the present case, the court thought that it would be altogether too harsh a rule to hold the defendant liable because he did not obtain the consent of the father to the administration of the anesthetic. Since the defendant was confronted with an emergency, and since he obtained the consent of his patient, the consent of the father was not necessary. The court could find no evidence of malpractice and consequently dismissed the complaint.—*Sullivan v. Montgomery (N. Y.), 279 N. Y. S. 575.*

Malpractice: Death During Administration of Ethylene and Ether Anesthesia.—The physician-defendant administered an anesthetic, consisting of a mixture of ethylene, ether, carbon dioxide and oxygen, while another physician removed the patient's appendix and drained her gallbladder. The operating physician in order to facilitate the closing of the incision requested a deeper anesthesia. As the oxygen supply was becoming rapidly depleted, a full tank of oxygen had to be installed, which required about five minutes, during which time the physician-defendant continued to administer the anesthetic. At about the time he began to administer the fresh supply of oxygen, the patient ceased to breathe and died. The plaintiffs, the husband and daughter of the deceased patient, sued the physician-defendant. From a judgment in favor of the plaintiffs, the physician appealed to the district court of appeal, second district, division 1, California.

The plaintiffs contended that the patient's death was caused by suffocation due to the physician-defendant's negligence in failing to administer a sufficient supply of oxygen in the anesthetic mixture. The physician-defendant contended that death resulted from heart failure and surgical shock unrelated to the anesthesia. The medical experts agreed that the symptoms of an overdose of ethylene gas are cyanosis appearing before death, labored, rapid and shallow breathing, and a drop in blood pressure following cessation of respiration, but that a drop in blood pressure prior to cessation of respiration would indicate a death caused by heart failure. The evidence showed that the symptoms preceding the patient's death were cyanosis following cessation of respiration, normal breathing up until cessation of respiration, and a drop in the systolic blood pressure five minutes preceding death from 135 to 105. The plaintiffs' only expert witness, an osteopath, in answer to a hypothetical question which assumed a normal blood pressure

during the anesthesia and omitted the last blood pressure reading, and which did not assume normal respiration up until cessation of respiration, testified that in his opinion death resulted from asphyxiation. The district court of appeals held that the hypothetical question was palpably deficient in that it omitted to state the last blood pressure reading and contained false hypotheses in assuming normal blood pressure during the anesthesia and in assuming normal respiration up until its cessation. The opinions of expert witnesses, said the court, based on hypothetical questions, are admissible if they are honest opinions predicated on facts established by the evidence. They are inadmissible if based on essential facts which are not given in evidence, on facts which are directly contrary to the evidence, or on statements omitting important facts. A hypothetical question need not include all the facts testified to and it may assume facts most favorable to the theory of the party propounding it. There may be an allowable variation between the facts assumed and the actual facts proved, but the material facts assumed must be substantially true. Where the material facts on which the opinion is based are untrue the opinion itself becomes false, misleading and incompetent. The court held that the opinion of the plaintiffs' expert witness as to the cause of death was worthless, because it was based on false hypotheses and its admission was reversible error because it prejudiced the physician-defendant's case.

Accordingly, the judgment of the trial court was reversed.—*Forbis v. Holzman (Calif.), 45 P. (2d) 215.*

Corporate Practice of Dentistry Illegal in Illinois.—The Dr. Allison, Dentist, Inc., the plaintiff in this action, entered into a contract with the defendant dentist wherein the latter agreed, according to the record, "that he would not practice operative dentistry for a period of three years at any place within two miles of the corporate location." Shortly thereafter the dentist opened a dental office directly across the street from the corporate dental parlors and the corporation sought to enjoin the violation of the agreement. The trial court, in denying the injunction, held that the plaintiff corporation was illegally practicing dentistry, that the corporation's only damage would arise out of competition in a line of business which it could not lawfully follow, and that therefore the petition of the corporation for an injunction did not appeal to the conscience of a court of equity. The corporation appealed to the Supreme Court of Illinois, contending that section 18a of the dental practice act, which prohibits corporations from practicing dentistry, was unconstitutional.

The Supreme Court, however, considered it to be unnecessary to pass on the constitutional question. The gist of the corporation's complaint, and its claim to equitable relief, was based on damages alleged to be feared through the defendant's competition in practicing dentistry. The practice of a profession, said the court, is everywhere held to be subject to licensing and regulation under the police power and not subject to commercialization or exploitation. To practice a profession requires something more than the financial ability to hire competent persons to do the actual work. It can be done only by a duly qualified human being, and something more than mere knowledge or skill is essential to qualify. The qualifications include personal characteristics, such as honesty, guided by an upright conscience and a sense of loyalty to clients or patients, even to the extent of sacrificing pecuniary profit, if necessary. These requirements are spoken of generically as that good moral character which is a prerequisite to the licensing of any professional man. No corporation can qualify. It can have neither honesty nor conscience, and its loyalty must, in the very nature of its being, be yielded to its managing officers, its directors and its stockholders. Its employees must owe their first allegiance to their corporate employer and cannot give the patient anything better than a secondary or divided loyalty.

The corporation, in its complaint, stated that the dentist had acquired secrets and confidential information in regard to the patrons of the corporation. It might be well inquired, said the court, in whom are these personal secrets imposed when a corporation attempts to practice? Can it be in the president alone, or is he under the corporate duty of disclosing them to his directors? And are the directors under the further corporate duty of disclosing them to stockholders? This very allegation of the corporation clearly demonstrates, the court said, the inappropriateness of any corporate attempt to practice one of the learned professions, involving personal and confidential relations, and most clearly demonstrates that such practice is not and cannot be open to commercial exploitation. The corporate charter of the corporation, the court said, did not and could not authorize it to practice dentistry, and the trial court quite properly dismissed the complaint.—*Dr. Allison, Dentist, Inc., v. Allison (Ill.), 196 N. E. 799.*

Malpractice: Sponge Left in Patient.—The appellant, a physician, performed an appendectomy on the appellee, June 19, 1931. During the course of the operation the physician discovered that the patient had gallstones, and a second incision several inches above the first was made and the gallstones were removed. The second incision healed quickly and normally. The lower wound continued to discharge pus and did not heal. About six months later, the physician removed from the appendectomy wound a gauze sponge. Thereafter the wound healed in about two weeks. The patient sued the physician and obtained judgment for $9,896, from which the physician appealed to the Supreme Court of Oklahoma.

The physician argued that if he adopted and used the recognized and customary method of keeping track of sponges, he could not be considered negligent even if a sponge was left in the patient's body. While there is substantial authority, said the court, to the effect that the leaving of a sponge in the body of a patient constitutes negligence per se, the better rule is that a physician, like other persons, is bound to exercise ordinary care to avoid injuring any one with whom he comes in contact. The fact that a physician adopts and uses the recognized and customary method of keeping count of sponges will not afford a complete shield from liability, if in fact a sponge is left in the patient's body. The real test is whether the physician, and the nurses acting under his authority, exercise ordinary care in keeping track of the sponges and seeing to it that they are all removed before the incision is closed. The fact that in the present case one of the nurses who was assigned the task of keeping count of the sponges might have made a miscount would not alter the situation. The physician admitted that the nurses were employed and directed by him and he would therefore be liable for their acts of negligence in connection with the operation.

The physician further contended that an instruction given by the trial court imposed on the jury the duty to segregate the injuries suffered by the patient due to the negligence of the physician in leaving a sponge in her body from her injuries due to the operation itself, and that there was no evidence to support such segregation. It was admitted, said the Supreme Court, that the incision made for the removal of the gallstones, where no sponge was involved, healed promptly and completely, and that the other wound drained pus and caused the patient pain and suffering continuously until the sponge was removed. Under these circumstances, the court said, it would be unreasonable to say that there was no evidence of extra suffering on account of the sponge.

After reviewing all the evidence, it was the opinion of the Supreme Court that the question of the physician's negligence was properly submitted to the jury. There was, however, no evidence, either lay or expert, to support the plaintiff's allegation that her injuries were permanent. Up to the time the appendectomy wound healed, there was objective evidence of suffering, a part of which, at least, could be attributed to the presence of the sponge. After the wound healed, her sufferings were largely subjective, and both the continuance of such sufferings and their connection with the sponge would be matters to be established by expert testimony. There was no such testimony offered and whatever suffering the patient may have endured after the wound healed could not be charged to the fact that a sponge had been left in the body, except as a pure surmise. In the opinion of the court, it clearly appeared from the size of the verdict that the jury must have taken into consideration probable future suffering. There being no competent evidence to support a finding of future suffering, the verdict was excessive. The court ordered, therefore, that if the patient consented to a reduction of the verdict to $5,000

the judgment of the trial court, as thus modified, would be affirmed. Otherwise the judgment would be reversed and the cause remanded for a new trial.

The patient's husband filed a separate suit against the physician to recover damages for expenses and loss of services of his wife due to the alleged negligence of the physician. The trial court gave judgment for the husband in the amount of $734, and this judgment was affirmed by the Supreme Court of Oklahoma.—*Aderhold v. Stewart (Okla.), 46 P. (2d) 340; Aderhold v. Stewart (Okla.), 46 P. (2d) 346.*

Workmen's Compensation Acts: Physician as an Employee or Independent Contractor.—The Goodman Medical Association, composed largely of the employees of the Goodman Lumber Company, was organized for the primary purpose of furnishing medical and hospital services to its members. Dr. Jacob Gomber entered into a written contract with the association to perform such services as a physician and surgeon as were required to be furnished by the Goodman Lumber Company and another company under the workmen's compensation act of Wisconsin, to testify in any case arising out of industrial accidents, to be superintendent of a hospital maintained by the association, and generally to render medical care to members of the Goodman Medical Association. On Aug. 2, 1932, he was requested by the Goodman Lumber Company and the association to testify before the industrial commission. On the way to the hearing, he injured two fingers of his right hand when his automobile door closed on them. Infection set in, necessitating first an amputation of the middle finger and later on the amputation of his arm. He sought compensation under the workmen's compensation act, and from a judgment of the circuit court confirming the order of the commission denying compensation, he appealed to the Supreme Court of Wisconsin. Pending the appeal, he died and his administrator was substituted as plaintiff.

It is obvious, said the Supreme Court, that the examiner, the commission and the circuit court regarded the contract between the association and Dr. Gomber as requiring the latter to render only professional services. It has been generally held that the relation between a hospital and a physician employed by it is not that of master and servant. Physicians and surgeons employed by hospitals to minister to the sick and the infirm continue to be professional men who practice their profession according to their best judgment and discretion. While so practicing they are in no sense of the word subject to the orders or control of their hospital employers or bound in treating the sick to follow their directions. In a note in 19 A. L. R. 1183 it is stated:

> The decisions of which the rationale is that physicians and surgeons are not the servants of their employers are referable to the conception that they are "professional men" who are engaged on the understanding that they are to "exercise their profession to the best of their abilities according to their own discretion; but in exercising it they are in no way under his (their) orders or bound to obey his (their) directions." This theory as to the nature of their position necessarily implies that they are independent contractors—a designation which has sometimes been specifically applied to them.

In this case, however, Dr. Gomber was employed to perform many duties that were not professional in character. He served as superintendent of the hospital. While so acting, his status was that of a servant. *Schloendorff* v. *Society of New York Hospital,* 211 N. Y. 125, 105 N. E. 92, 52 L. R. A. (N. S.) 505, Ann. Cas. 1915C, 581. He also managed the hospital pharmacy and in that capacity bought and sold drugs for the association. He was required to attend hearings of the industrial commission in which employees of either the Goodman Lumber Company or another company were interested. His attendance on such hearings was clearly under the control of the association. The association had the authority to direct him where and when to go. The workmen's compensation act of Wisconsin defines employee to include: ". . . (4) Every person in the service of another under any contract of hire, express or implied. . . ." This language, in the opinion of the court, was sufficiently broad to bring the facts of the present case within it and to impel the conclusion that Dr. Gomber's status at the time he was injured was that of an employee. The judgment of the circuit court was reversed, with directions to reverse the order of the industrial commission and to return the record to the commission for further proceedings.—*Gomber v. Industrial Commission (Wis.), 261 N. W. 409.*

Accident Insurance: Sunstroke an Accidental Injury; Delayed Demand for Autopsy.—The insurance company promised to pay certain benefits under a policy insuring "against the effects resulting directly and exclusively of all other causes, from bodily injuries sustained solely through external, violent and accidental means." The insured, during the usual course of his employment, suffered a sunstroke and died. The company, contending that the death was not accidental, denied liability. The beneficiary obtained judgment in the trial court, and the company appealed to the Supreme Court of Oklahoma.

The Supreme Court, in denying the company's contention that a sunstroke does not constitute an accidental injury, said it was not inclined to depart from the holding in the case of *Continental Cas. Co.* v. *Clark,* 70 Okla. 187, 173 P. 453, wherein it was said:

> . . . That "accidental means" is used to denote "accidental cause," and in case of sunstroke, if the same was suffered while the insured was engaged in his usual avocation or going about his affairs in an ordinary manner as any other person might have been under like or similar circumstances, and did not intentionally and voluntarily subject himself to an intense heat calculated to produce sunstroke, with the knowledge that it would probably occur, then the sunstroke was suffered from "accidental means" or "accidental cause," within the meaning of the policy.

The insurance policy in the present case contained a provision entitling the insurer to an autopsy in case of death where such procedure was not forbidden by law. The insurance company contended that it was denied the right to make the autopsy. The insured died on July 27, and notice of the death was received by the company August 2. The body was buried in Mississippi, July 30. Nothing was said by the company with respect to an autopsy until September 10, when demand was first made. Coupled with this demand was a further request for permission to remove any specimen or specimens for chemical, microscopic, pathologic, laboratory or other examination. The request was refused as not being in accord with the terms of the policy and for the further reason that the request was not made within a reasonable time. No claim was made that an autopsy would have disclosed that the insured died of or from any cause other than sunstroke. There was, therefore, no showing whatever that the company was prejudiced by the refusal of the request for an autopsy. In fact, the beneficiary never did refuse an autopsy within the terms of the policy, because no request limited to such terms was ever made. No explanation was offered for the delay of some five or six weeks in requesting an autopsy. The court held that there was no merit in this contention by the company.

Finding no substantial error in the record, the judgment of the trial court for the beneficiary was affirmed.—*Provident Life & Accident Ins. Co. v. Green (Okla.), 46 P. (2d) 372.*

Society Proceedings

COMING MEETINGS

Annual Congress on Medical Education, Medical Licensure and Hospitals, Chicago, Feb. 17-18. Dr. W. D. Cutter, 535 North Dearborn Street, Chicago, Secretary.

Eastern Section, American Laryngological, Rhinological and Otological Society, Newark, N. J., Jan. 3. Dr. Henry B. Orton, 24 Commerce St., Newark, N. J., Chairman.

Middle Section, American Laryngological, Rhinological and Otological Society, Milwaukee, Jan. 11. Dr. William E. Grove, 324 East Wisconsin Avenue, Milwaukee, Chairman.

Mid-Western Section, American Laryngological, Rhinological and Otological Society, St. Louis, Jan. 15. Dr. Harry W. Lyman, Carleton Building, St. Louis, Chairman.

Society of Surgeons of New Jersey, Jersey City, Jan. 15. Dr. Walter B. Mount, 21 Plymouth St., Montclair, Secretary.

Southern Section, American Laryngological, Rhinological and Otological Society, Jackson, Miss., Jan. 18. Dr. Robin Harris, Lamar Building, Jackson, Miss., Chairman.

Western Section, American Laryngological, Rhinological and Otological Society, Del Monte, Calif., Feb. 1-2. Dr. Carroll Smith, Paulsen Building, Spokane, Wash., Chairman.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Periodicals are available from 1925 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

10: 849-994 (Oct.) 1935

The Production of Collateral Circulation to the Heart: I. Experimental Study. C. S. Beck and V. L. Tichy, Cleveland.—p. 849.

Id.: II. Pathologic Anatomic Study. A. R. Moritz and C. S. Beck, Cleveland.—p. 874.

*Precordial Lead of Electrocardiogram (Lead IV) as Aid in Recognition of Active Carditis in Rheumatic Fever. R. L. Levy and H. G. Bruenn, New York.—p. 881.

Form of Electrocardiogram in Experimental Myocardial Infarction: II. Early Effects Produced by Ligation of Anterior Descending Branch of Left Coronary Artery. F. D. Johnston, I. G. W. Hill and F. N. Wilson, Ann Arbor, Mich.—p. 889.

Id.: III. Later Effects Produced by Ligation of Anterior Descending Branch of Left Coronary Artery. F. N. Wilson, I. G. W. Hill and F. D. Johnston, Ann Arbor, Mich.—p. 903.

Cerebral Blood Flow in Man as Influenced by Adrenalin, Caffeine, Amyl Nitrite and Histamine. F. A. Gibbs, E. L. Gibbs and W. G. Lennox, Boston.—p. 916.

The Precordial Electrocardiogram: I. Potential Variations of the Precordium and of Extremities in Normal Subjects. C. E. Kossmann, New York, and F. D. Johnston, Ann Arbor, Mich.—p. 925.

*Electrocardiographic Abnormalities Characteristic of Certain Cases of Arterial Hypertension. H. E. Rykert and J. Hepburn, Toronto.—p. 942.

Mortality Rates of Organic Diseases of the Heart by Geographic Areas in the United States. C. C. Dauer, New Orleans.—p. 955.

Modification of Wiggers-Dean Method of Recording Heart Sounds Using Audio Amplification. H. A. Sacks, H. Marquis and B. Blumenthal, Chicago.—p. 965.

Lead 4 in Carditis in Rheumatic Fever.—Levy and Bruenn state that, if successive electrocardiograms are taken in rheumatic fever, lead 4 may furnish evidence of active carditis when changes indicating active myocardial involvement are not observed in the standard three leads. Frequently, gross variations in the contour of lead 4 indicate the significance of minor alterations in the three standard leads which might otherwise be regarded as of doubtful importance. This statement applies particularly to slight changes in the T wave in lead 3. On occasion, changes denoting rheumatic lesions in the cardiac muscle are present in the first three leads when no change is apparent in lead 4. In ambulatory patients with rheumatic heart disease, a single electrocardiogram may reveal evidence of myocardial damage only in lead 4. On the basis of a single record, however, it is not possible to establish the presence of rheumatic activity in the heart. Changes in the electrocardiogram characteristic of myocardial involvement were found in five patients whose hearts at necropsy showed lesions of active rheumatism. In two patients, in whom active rheumatic carditis was suspected during life but was not found at necropsy, the electrocardiograms were normal. In rheumatic fever the use of lead 4 is of clinical value as an aid in the recognition of active myocardial involvement and in following its course.

Electrocardiographic Changes in Arterial Hypertension.—Rykert and Hepburn point out that, in the course of an investigation into the serial electrocardiographic changes following acute coronary occlusion, one of them found cases showing abnormalities of the ventricular complexes (QRST) of an unusual type. In certain respects the abnormalities observed in the records of these cases simulated and in other respects differed from the typical electrocardiographic changes found in myocardial infarction. Without exception these atypical records showed an identical type of electrocardiographic abnormality. A diagnosis of coronary thrombosis had been made largely on this electrocardiographic abnormality. The clinical histories, while in some cases suggestive, in practically all gave only inconclusive support to that diagnosis. Of 143 patients in the series, 124 had arterial hypertension at the time the electrocardiographic records were obtained. The patient who had a systolic blood pressure of 160 mm. of mercury or higher was considered to have arterial hypertension. Eighty-three had a systolic pressure of 200 mm. of mercury or more, and in forty-one cases the systolic pressure varied between 160 and 200 mm. of mercury. The diastolic pressure readings were correspondingly high. In the other nineteen cases the systolic pressure was found to be less than 160 mm. of mercury. A diagnosis of myocardial disease was made in all cases. Of the 143 patients, 126 had chronic degenerative heart disease. The size of the heart was determined accurately in eighty-three cases by means of orthodiagrams and in the remainder by percussion. Moderate to marked cardiac enlargement was present in seventy-three, and enlargement of slight degree was present in the other ten. Objective evidence of cardiac insufficiency, i. e., râles at the base of the lung, enlargement of the liver and dependent edema, was found in eighty-two cases and was more often of moderate than of marked degree. In the remainder, congestive failure occurred with a normal heart rhythm. A diagnosis of endocardial disease was made in twenty-nine of the 143 cases. It was found in eleven of the nineteen cases in which the systolic blood pressure was less than 160 mm. of mercury and in only eighteen of 124 cases in which hypertension was present. Aortic valve disease, either alone or combined with mitral lesions, occurred in twenty-seven of the twenty-nine patients who were found to have endocardial disease, and two had mitral stenosis.

American Journal of Ophthalmology, St. Louis

18: 903-1002 (Oct.) 1935

Uveal Sarcoma: Malignant Melanoma: Statistical Study of Ninety-Four Cases. T. L. Terry and Juanita P. Johns, Boston.—p. 903.

Measurement (Roentgenometry) of Anteroposterior Diameter of Eyeball in Situ Correlated with Micrometer Measurement Following Enucleation. D. Katz and A. C. Ledoux, Chicago.—p. 914.

Congenital and Acquired Deficiencies of Fusion. A. Bielschowsky, Breslau, Germany.—p. 925.

Ocular Complications in Neuroblastoma. P. J. Leinfelder, Iowa City.—p. 938.

Strabismus in Children Corrected by Refraction Alone. G. P. Guibor, Chicago.—p. 944.

Bacillus Pyocyaneus Infection of the Eye: Report of Two Cases. W. W. Lanou, Iowa City.—p. 950.

Trachoma as an Endemic Disease in Egypt. F. Massoud, Cairo, Egypt.—p. 952.

Archives of Neurology and Psychiatry, Chicago

34: 931-1132 (Nov.) 1935

Electrical Stimulation of Points in Forebrain and Midbrain: Resultant Alterations in Blood Pressure. H. Kabat, H. W. Magoun and S. W. Ranson, Chicago.—p. 931.

Volume of Blood in Normal Subjects and in Patients with Schizophrenia. J. M. Looney and H. Freeman, Worcester, Mass.—p. 956.

Tumors of Corpus Callosum: Pathologic and Clinical Study. H. C. Voris, Chicago, and A. W. Adson, Rochester, Minn.—p. 965.

Effect of Extract of Adrenal Cortex on Experimental Neurosis in Sheep. H. S. Liddell, O. D. Anderson, E. Kotyuka and F. A. Hartman, Ithaca, N. Y.—p. 973.

*Possible Relation of Lead Intoxication to Multiple Sclerosis. B. Boshes, Chicago.—p. 994.

Relationship of Unconsciousness to Cerebral Blood Flow and to Anoxemia. W. G. Lennox, F. A. Gibbs and E. L. Gibbs, Boston.—p. 1001.

Can the Problem of Neuroses Be Formulated More Concisely? O. S. English, Philadelphia.—p. 1014.

Experimental Convulsions Induced by Administration of Thujone: Pharmacologic Study of Influence of Autonomic Nervous System on These Convulsions. H. M. Keith and G. W. Stavraky, Montreal.—p. 1022.

Visceral and Referred Pain. L. J. Pollock and L. Davis, Chicago.—p. 1041.

*Removal of Left Cerebral Hemisphere: Report of Case. R. Zollinger, Boston.—p. 1055.

Lead Intoxication and Multiple Sclerosis.—Boshes analyzed specimens of cerebrospinal fluid from twenty-eight patients for lead by the Fairhall hexanitrite method. In one of sixteen cases of multiple sclerosis the fluid showed a positive result. The patient had been given sodium iodide, and the urine also showed lead. Of twelve other cases of various conditions, in only one, a case of lead intoxication, were abundant crystals found in the cerebrospinal fluid. In this case there was 0.2 mg. of lead per liter of urine. Taking all three studies into consideration, there is no adequate proof for, and ample evidence against, the theory that lead is an etiologic agent in cases of multiple sclerosis.

Removal of Left Cerebral Hemisphere.—Zollinger removed the left cerebral hemisphere because of extensive infiltration by a tumor in a right-handed woman. During the seventeen days that she survived, an elementary vocabulary was retained, which was partially increased by training in speech. It was difficult to evaluate the mental capacity of the patient. She was more calm after operation but was less willing to perform coordinated movements. She did experience emotional reactions, but they were not marked. The functions of the cranial nerves were well preserved except for slight weakness of the right side of the face and absence of the corneal reflex on the left. The spastic paralysis on the right side was replaced by flaccid paralysis. The presence of acute pain with motion of the joints or compression of the deep muscles demonstrated the existence of a center of sensation below the cortex. Studies of the vasomotor responses of the extremities by determinations of skin temperature did not show measurable alterations in peripheral temperature regulation on either the ipsilateral or the contralateral side.

Archives of Ophthalmology, Chicago

14: 699-878 (Nov.) 1935

Results of Cervical Sympathectomy in Pigmentary Degeneration of the Retina. F. B. Walsh and Louise L. Sloan, Baltimore.—p. 699.
The Reattached Retina: Physiologic, Ophthalmoscopic and Microscopic Observations and Comparisons. E. B. Spaeth, Philadelphia.—p. 715.
*Survey of Cases of Sympathetic Ophthalmia Occurring in New York State. H. H. Joy, Syracuse, N. Y.—p. 733.
Albrecht von Graefe, Founder of Modern Ophthalmology: His Life and Works. C. A. Perera, New York.—p. 742.
The Problem of the Crystalline Lens. B. L. Gordon, Atlantic City, N. J.—p. 774.
Structure of the Vitreous. J. S. Friedenwald and R. D. Stiehler, Baltimore.—p. 789.
Two Different Fundus Pictures in Metastatic Choroidal Carcinoma: Clinicopathologic Study. J. W. Smoleroff and S. A. Agatston, New York.—p. 809.

Sympathetic Ophthalmia in New York State.—Joy points out that sympathetic ophthalmia occurs less frequently than its diagnosis, since uveitis due to other causes, especially that due to tuberculosis, may give a similar clinical picture. A routine microscopic examination of the enucleated exciting eye is indicated if only for its statistical value. In 151 cases in which the clinical features of sympathetic ophthalmia were present, 126 exciting eyes were enucleated, forty-eight of which were examined microscopically: in all but seven the diagnosis was confirmed. The forty-one cases in which the diagnosis was established showed a higher percentage of final visual defects than did the cases in which no microscopic examination was made. Pathologic examination would eliminate the question of correct diagnosis. Analysis of the forty-one confirmed cases indicates that: 1. The frequency of sympathetic ophthalmia is not decreasing. 2. Nonperforating trauma may not be a rare exciting cause. 3. Sympathetic ophthalmia due to cataract extraction is unusually violent and the prognosis grave. 4. The interval between injury to the exciting eye and the onset of sympathetic inflammation may vary from nine days to twenty-four years or possibly to forty-eight years. 5. Sympathetic ophthalmia may be feared for at least two months after enucleation of the exciting eye. 6. Removal of the exciting eye before the onset of sympathetic inflammation does not favorably influence the ultimate outcome if the enucleation is delayed twenty-six days or more after the injury. 7. Sympathetic ophthalmia in children is unusually severe and the outcome unfavorable. 8. Removal of the exciting eye favorably influences the ultimate outcome in the sympathizing eye.

Canadian Public Health Journal, Toronto

26: 469-522 (Oct.) 1935

Diphtheria Toxoid: Comparison of One Dose of Alum Precipitated with Three Doses of Unmodified Toxoid. D. T. Fraser and K. C. Halpern, Toronto.—p. 469.
Serial Titrations of Diphtheria Antitoxin Following Toxoid. D. T. Fraser and K. C. Halpern, Toronto.—p. 476.
Communicable Disease as Administered by the Department of Pensions and National Health. C. P. Brown, Ottawa.—p. 482.
The Present Antituberculosis Program in Ontario. D. W. Crombie, London, Ont.—p. 486.
Provincial Program for Control of Tuberculosis. W. J. Dobbie, Weston, Ont.—p. 494.

Colorado Medicine, Denver

32: 865-952 (Nov.) 1935

Specific Treatment of Various Streptococcic Infections with Human Convalescent Serum. H. L. Baum, Denver.—p. 876.
Immune Blood and Serum in Prophylaxis and Active Treatment of Measles and Scarlet Fever. R. H. Verploeg, Denver.—p. 881.
Use of Serum in Treatment of Erysipelas. O. S. Philpott, Denver.—p. 883.
Theory of Convalescent Serum Therapy. Frances McConnell, Denver.—p. 884.
Medical Russia. N. Mumey, Denver.—p. 890.
Ectopic Pregnancy. M. Weiner, Denver.—p. 894.
*Stream Pollution. B. V. Howe, Denver.—p. 897.
Proposed Device Which Is Capable of Continuously Indicating Approximate Percentage of Carbon Dioxide in Stream of Flowing Gases: Circulation of Irritant Dust of Soda Lime Within Modern Gas Machine. W. B. Draper and B. B. Longwell, Denver.—p. 899.

Stream Pollution.—Howe speaks of a triple threat in stream pollution: it is a direct menace to health by rendering water supplies dangerous and unfit to drink, it threatens many recreation spots on the shores of lakes and streams by making bathing dangerous, and streams may become periodically so offensive that property values in the vicinity are depreciated. Natural cleansing processes are effective to only a limited extent. Typhoid, dysentery and infectious diarrhea are filth diseases transmitted through human excreta. Water contaminated by sewage carries the bacteria of these diseases. Edibles that have been irrigated with this contaminated water are a means by which these diseases may be transmitted. The importance of cleaning up streams cannot be overestimated. Dwellers near streams have the fundamental right to receive the water coming to them in its natural purity, and their obligation is to pass it on to their neighbors unimpaired in quality.

Journal of Nervous and Mental Disease, New York

82: 373-496 (Oct.) 1935

Trophic Lesions in Multiple Sclerosis. C. M. Byrnes, Baltimore.—p. 373.
Group Therapy and the Psychiatric Clinic. L. C. Marsh, Tucson, Ariz.—p. 381.
Visual Fields Defects as Deciding Diagnostic Factor in Lesions of Temporal Lobe Simulating Cerebellar Involvement. A. Gordon, Philadelphia.—p. 394.
Personality Studies in Thirty Migraine Patients: Preliminary Report. Olga Knopf, New York.—p. 400.
Amyotrophic Lateral Sclerosis Syndrome and Trauma. S. E. Jelliffe, New York.—p. 415.

Journal of Thoracic Surgery, St. Louis

5: 1-112 (Oct.) 1935

Some Dramatic Thoracic Operations. J. Alexander, Ann Arbor, Mich.—p. 1.
Recurrence of Bronchiectasis Following Mass Ligation of Hilus of Lobe: Report of Case with Comment on Certain Technical Points Pertaining to Lobectomy. H. L. Beye, Iowa City.—p. 18.
Pedicled Muscle Flap in Closure of Persistent Bronchopleural Fistula, with Description of Preservation and Employment of Intercostal Muscle Bundles by Process of Ribboning (for Avoidance of Abdominal Hernia) in Obliteration of Large Chronic Empyema Cavities. O. H. Wangensteen, Minneapolis.—p. 27.
*Pneumonectomy for Malignant and Suppurative Disease of Lung: Report of Eight Cases. R. H. Overholt, Boston.—p. 54.
Evaluation of Interpleural Adhesions by Oblique Roentgenography, with Reference to Intrapleural Pneumonolysis in Pulmonary Tuberculosis. C. Haight and C. B. Peirce, Ann Arbor, Mich.—p. 83.
Pneumothorax by Open Operation. F. Torek, New York.—p. 90.
Bronchoscopy in Diagnosis of Asthma Complicating Pulmonary Tuberculosis. D. H. Ballon, Montreal.—p. 103.

Pneumonectomy for Malignant Disease of Lung.—Within the last eighteen months, Overholt operated on thirteen patients for carcinoma of the lung. Metastatic involvement was found on exploration in seven patients, and pneumonectomy was carried out in six patients with three recoveries. Two additional successful pneumonectomies have been performed on patients with suppurative disease of the lung, giving a total of five successful operations. In the patients with suggestive symptoms or a suspected primary malignant condition of the lung he employs chest roentgenograms, bronchoscopy, a search for metastasis including roentgenograms of the long bones, skull and spine, evaluation of the operative risk, preliminary pneumothorax and intrapleural thoracoscopy to determine, if possible, the presence or absence of pleural or mediastinal metastasis. It has been his policy (1) to explore all cases of proved carcinoma of the lung if an extension beyond the lung cannot be

demonstrated by the foregoing methods, provided the general condition is fair, and (2) to explore in the face of a negative bronchoscopic report if the history and roentgenograms suggest a peripheral neoplasm.

Kansas Medical Society Journal, Topeka

36: 441-484 (Nov.) 1935

Differential Diagnosis of Coronary Artery Disease. A. C. Ernstene, Cleveland.—p. 441.

Surgical Treatment of Obstructing Lesions of Biliary Tract. W. Walters, Rochester, Minn.—p. 446.

Embolism of Extremities. R. A. McIlhenny, R. C. McIlhenny, Conway Springs, and K. E. Voldeng, Wellington.—p. 450.

Mental Injury. W. M. Brewer, Hays.—p. 457.

Military Surgeon, Washington, D. C.

77: 239-294 (Nov.) 1935

Gunshot Wounds of Liver. J. W. Davis.—p. 239.

Traumatic Rupture of Renal Pedicle with Many Complications: Report of Case with Recovery. J. A. Bethea and W. L. Peterson.—p. 253.

Relation of Insects to Disease: Notes. W. A. Riley.—p. 256.

*Hematemesis: Diagnostic Significance and Treatment. L. L. Gardner. —p. 267.

Diverticula of Appendix: Case Each of True and False Varieties. L. B. Kline.—p. 275.

Cerebral Malaria While Receiving Atabrine: Case Report. H. E. Fraser.—p. 279.

Mushroom Poisoning. T. L. Gore and E. J. Tracy.—p. 281.

Diagnostic Significance and Treatment of Hematemesis.—Gardner groups the causes of hematemesis under the three headings of intrinsic gastroduodenal or jejunal lesions, varices and infrequent causes, and he states that 90 per cent of all cases of hematemesis are due to intragastric lesions. Moderate hemorrhage late in the course of chronic dyspepsia suggests gastric ulcer. Severe hemorrhage early in the course of chronic dyspepsia suggests duodenal ulcer. Slight hemorrhage in the course of chronic dyspepsia in a patient in the cancer age suggests carcinoma of the stomach. Profuse or fatal hemorrhage without any history of indigestion or illness suggests cirrhosis of the liver. Profuse hemorrhage with obvious splenic enlargement suggests splenic anemia. If the hemorrhage is not due to any of the conditions enumerated, less frequent and more obscure causes must be sought. The treatment of hematemesis, particularly that from peptic ulcers, is medical. Transfusions should be employed as indicated.

Missouri State Medical Assn. Journal, St. Louis

32: 425-460 (Nov.) 1935

Tumors of Head of Pancreas: Value of Cholecystenterostomy. W. T. Coughlin and J. M. McCaughan, St. Louis.—p. 425.

Diagnosis and Management of Cancer of Stomach. C. J. Hunt, Kansas City.—p. 431.

Adrenal Hypercortical and Hypermedullary Syndromes. A. A. Werner, St. Louis.—p. 434.

*Pulmonary Tuberculosis Associated with Valvular Heart Lesions. W. W. Buckingham and J. S. Hoffman, Kansas City.—p. 438.

Pneumothorax Treatment of Lobar Pneumonia. J. J. Hammond and R. L. Smith, St. Louis.—p 441.

Genito-Urinary Infections. A. L. Osborn, Kansas City.—p. 444.

Urologic Findings in General Practice. A. Van Ravenswaay, Boonville. —p. 448.

Pregnancies After Nephrectomy for Tuberculosis. E. Lissack, Concordia.—p. 450.

Pulmonary Tuberculosis and Valvular Heart Lesions.—Buckingham and Hoffman state that recent observations have shown that the view of Rokitansky that tuberculosis of the lung and heart disease do not occur together is untenable and that association of phthisis with primary heart disease is probably more common than is usually suspected. Lawrason Brown, in 7,115 necropsies on tuberculous patients, found 0.9 per cent of valvular heart disease; Norris, in 8,154 necropsies, found 3.5 per cent; Anders reports six cases of mitral disease with pulmonary tuberculosis, and Bronfin and Simon, on the clinical examination of 2,100 tuberculous patients, found approximately 6 per cent with valvular lesions, chiefly mitral insufficiency and stenosis, with varying degrees of cardiac symptoms. However, the views of Rokitansky are held by many competent observers. Five cases of pulmonary tuberculosis are presented: three of rheumatic heart disease with mitral involvement and two with congenital heart disease, which occurred in a series of 522 cases of adult pulmonary tuberculosis treated at the Kansas City Tuberculosis Hospital during the last two years.

New England Journal of Medicine, Boston

213: 841-892 (Oct. 31) 1935

New Method of Calculating Discharge Rates in Mental Diseases, with Especial Consideration of Age Factor. N. A. Dayton, Boston.—p. 841.

Hemoptysis in Trichiniasis. L. J. Goldwater, I. Steinberg, New York; H. Most, London, England, and J. E. Connery, New York.—p. 849.

Uncinariasis and Appendicitis. M. K. King, Savannah, Ga.—p. 851.

Cataracts and Dinitrophenol. D. G. Cogan and Frances C. Cogan, Boston.—p. 854.

Electrosurgical Appendectomy. L. R. Whitaker, Boston.—p. 856.

Primary Abscess of Omentum. R. W. French, Fall River, Mass.—p. 857.

Rôle of Peripheral Circulatory Failure in Clinical Medicine. D. W. Atchley, New York.—p. 861.

Economic and Social Aspects of Socialized Medicine. I. Galdston, New York.—p. 868.

Memories of a Great Physician, Dr. Frederick C. Shattuck, of Boston. J. B. Hawes 2d, Boston.—p. 873.

New Orleans Medical and Surgical Journal

88: 265-334 (Nov.) 1935

The Universal Challenge: Ewing Fox Howard Oration. G. S. Bryan, Amory, Miss.—p. 265.

Popular Beliefs and Superstitions About Eyes. C. A. Bahn, New Orleans.—p. 270.

*Inoculation and Sanitation in Control of Typhoid Fever. D. V. Galloway, Meridian, Miss.—p. 278.

Value of Blood Coagulation. G. E. Adkins, Jackson, Miss.—p. 287.

So-Called Agranulocytic Angina, with Especial Consideration of Causal Agents. W. H. Harris and H. J. Schattenberg, New Orleans.—p. 288.

Right Side of Heart in Pulmonary Diseases. L. Hart, Meridian, Miss. —p. 293.

Lipiodol and Some of Its Uses in Surgery. O. J. Bienvenu, Opelousas, La.—p. 295.

Bacteriology of and Experimental Work in Focal Infections. G. F. Fasting, New Orleans.—p. 298.

Control of Typhoid.—Galloway points out that typhoid vaccine given in adequate dosage to groups of people at an effective rate of 25,000 cc. per hundred thousand persons annually or more will influence the typhoid case rate and, if given to more than 90 per cent of the population, will control it. Sanitation alone will greatly reduce typhoid and in conjunction with other aids will control it. The carrier is the source of infection in an increasing proportion of the total cases; as control measures become effective, case to case infection is relatively easy to prevent. Mass typhoid immunization should be abandoned and selective immunization used as soon as a stable low case rate is attained. Selective immunization is aimed to protect those known to be in especial danger from cases or carriers or from environmental factors. Complete epidemiologic study of cases is difficult while the case rate is high, but records of such a study may be prepared as soon as the case rate is reduced by vaccination or other factors. Final reliance for typhoid control in an area should rest on intensive case and carrier work and sanitation, meaning sanitation in its broadest aspects of ensuring good personal hygiene. Lauderdale County has apparently reached a low stable incidence of typhoid and is ready to reduce mass immunization in favor of selective immunization, sanitation and intensive case and carrier control. Mississippi is probably ready to reduce mass immunization gradually as a policy in counties with full time service, as a low stable typhoid case rate has been attained. However, this can be done only if intensive epidemiologic study and control of cases and carriers is instituted and maintained and a high degree of sanitation is reached.

Ohio State Medical Journal, Columbus

31: 817-904 (Nov. 1) 1935

Appraisal of Organized Medicine in Ohio: Annual Address of the Retiring President. J. A. Caldwell, Cincinnati.—p. 833.

Organized Medicine and the Individual Physician: Inaugural Address of the Incoming President. R. R. Hendershott, Tiffin.—p. 837.

Treatment of Diabetes in Children. M. Deitchman, Youngstown.—p. 844.

Some Effects of Upright Position of Humans on Pregnancy, Parturition and Puerperium. A. Rogers, Columbus.—p. 847.

*New Treatment for Chronic Ulcers of Leg and Foot. C. H. Verovitz, Cleveland.—p. 850.

Treatment for Chronic Ulcers of Leg.—It occurred to Verovitz that breaking up of the fibrotic ring or sclerosed tissue surrounding ulcers (lifting the ulcer from its bed) and injecting a fresh supply of nourishing material, as blood, are needed for the healing of these ulcers. This he accomplishes by injecting patient's whole blood in the margin near the ulcer. In giving the injections, the ulcer and the edges surrounding the area are

cleansed with alcohol. A 2 per cent solution of iodine is painted over the area where the injection is given. A 10 cc. Luer syringe, with a 23 or 24 gage needle from 1 to 1½ inches in length, is employed. About 10 cc. of blood is taken from any of the veins at the bend of the elbow and is immediately injected in the ulcer. The injection is started one-fourth inch from the edge of the ulcer. The needle is inserted until it passes the resistant fibrotic area. The blood is slowly injected while the needle is gradually withdrawn. Sometimes one injection is given at a sitting, or multiple injections up to four have been given from one-fourth to one-half inch apart, depending on the size of the ulcer. In the first treatment the injections are started near the edges, and in the next treatment one-fourth inch nearer the center of the ulcer, and so on. In some cases the entire circumference was injected. In the beginning this procedure is frequently painful, and it is advisable to anesthetize the ulcer with a 2 per cent solution of procaine hydrochloride near the edges. Considerable force will be found necessary in order to penetrate through the sclerosed area. In the beginning of the treatment little bleeding is noticed from the needle puncture, but when new blood vessels and granulations begin to form bleeding becomes free. The treatment is repeated once a week until the ulcers show signs of healing, and then the injections are discontinued. The number of injections varies with the size and chronicity of the ulcer and with the extent of fibrosis in the surrounding area. Every two days the ulcer is cleansed with alcohol and dried, and 2 per cent mercurochrome is applied, the latter having some astringent properties. The ointment giving the best results is enough 10 per cent gentian violet applied on gauze to cover the ulcer. The clinical course of the healing of the ulcer appears as follows: The edges soften, bleeding from the needle puncture is free, and pink and healthy granulations appear at the base and edges. A seam of epithelium grows from the periphery toward the center of the ulcerated area. Sections taken from the healing ulcer show the base clean and free from necrotic material, the infiltration diminished and rete pegs spreading over the edge. Normal vessels with a single row of endothelial lining appear instead of the thrombosed infiltrated capillaries.

Surgery, Gynecology and Obstetrics, Chicago

61: 585-712 (Nov.) 1935

Experimental Production of Cholesterosis of Gallbladder, with Observations on Cholesterol Absorptive Properties of Gallbladder Wall. L. M. Rousselot and L. Bauman, New York.—p. 585.
The Intervertebral Disk: Embryology, Anatomy, Physiology and Pathology. R. J. Joplin, Boston.—p. 591.
Gastrojejunal Ulcer and Gastrojejunocolic Fistula. F. H. Lahey and N. W. Swinton, Boston.—p. 599.
*Treatment of Acute Fatal Hemorrhage by Injection of Artificial Blood Substitutes: Comparative Study of Artificial Blood Substitutes. A. W. J. H. Hoitink, Utrecht, Holland.—p. 613.
*Hypertonic Wet Dressing: Experimental Study. F. W. Taylor, Indianapolis.—p. 623.
Colostomy of Transverse Colon. F. Glenn. New York.—p. 629.
*Kraurosis Vulvae (Leukoplakia) and Scleroderma Circumscripta: Comparative Histologic Study. L. W. Ketron and F. A. Ellis, Baltimore. —p. 635.
Transduodenal Resection of Ampulla of Vater for Carcinoma of Distal End of the Common Duct, with Restoration of Continuity of Common and Pancreatic Ducts with Duodenum. V. C. Hunt and J. W. Budd, Los Angeles.—p. 651.
Complete Excision and Reconstruction of Both Achilles Tendons for Giant Cell Xanthoma. F. Young and C. T. Harris, Rochester, N. Y. —p. 662.
Acute Inflammation of Pancreas: Cause of Epigastric Pain in Gallbladder Disease and of Recurrent Pain After Cholecystectomy. R. Elman, St. Louis.—p. 670.
*Treatment of Senile Vaginitis with Ovarian Follicular Hormone. M. E. Davis, Chicago.—p. 680.
Ferric Chloride Coagulation in Treatment of Burns, with Résumé of Tannic Acid Treatment. G. L. Coan, Wyandotte, Mich.—p. 687.
Massive Resection of Small Intestine: Analysis of Two Hundred and Fifty-Seven Collected Cases. H. E. Haymond, Midwest, Wyo.—p. 693.

Treatment of Hemorrhage by Injection of Blood Substitutes.—Hoitink compared several artificial blood substitutes to determine their action in acute dangerous hemorrhages. For that purpose fatal hemorrhages that were biologically equivalent were produced in dogs to discover whether the dog's life could be saved by the injection of blood substitutes into the blood stream. In addition, a study was made of the influence of the infusion fluids on the blood, and of the hemorrhage and subsequent infusion of substitutes on the urine and sodium chloride excretion. It was found that none of the infusion liquids gave better results than the sodium chloride solution. The injection into a vein of a 0.9 per cent solution of sodium chloride after an acute dangerous hemorrhage is preferable to the use of other artificial substitutes and to blood transfusion.

The Hypertonic Wet Dressing.—Taylor shows that the amount of fluid that can be withdrawn by a hypertonic solution from 1 square inch of wound surface is from 1.2 to 1.5 cc. an hour. This amount varies between these figures regardless of the hypertonicity or nature of the solution. In general the more concentrated solutions gave the higher figure, but to all practical purposes they were identical. This at least held true for solutions with a hypertonicity between 3 and 23 (2.5 and 20 per cent sodium chloride). The values given are maximal for the animals used. They represent figures for new wounds with vascular muscle bases. In older wounds that had started to granulate, with surfaces partly covered by fibrin, the values varied to a considerable extent in different animals and were found to be lower. The fluid withdrawn by a hypertonic solution is water and not serum similar to that seen in burns. It contains only the amount of protein material that would normally diffuse from the wound. There is no increment of this caused by the hypertonic solutions. The value of this withdrawal seems to the author to be debatable for, after the initial dehydration of the surface tissues, the continued outpouring comes from the blood vessels themselves and is dependent on the vascularity of the area. In the light of the author's experiments on wet dressings, an effective hypertonic solution reaches only the superficial tissue. That the deeper tissues containing the active infection cannot possibly be reached by the solution is evident. The chief benefit derived from this type of dressing is its poulticing action. This keeps the skin soft and pliable. It prevents crusting and allows drainage. Above all, it soon becomes warmed by the body and this markedly increases the flow of capillary blood, thus improving the defense mechanism against infection. Bearing out this contention is the fact that isotonic saline and even hypotonic solutions (1:5,000 mercury bichloride) have been seen to give the same beneficial effects noted in hypertonic solutions.

Kraurosis Vulvae and Circumscribed Scleroderma.—Ketron and Ellis state that kraurosis vulvae (leukoplakia of the vulva) shows in a considerable percentage of cases peculiar degenerative changes in the connective tissue identical in appearance with those characteristic of white spot scleroderma. They believe that some cases at least which are diagnosed leukoplakia are examples of white spot scleroderma of the vulva. Here the characteristic degenerated collagenous bundles may be entirely replaced by secondary inflammatory and sclerotic tissue, owing to various local irritants. It is possible also that the vulvar tissue is peculiarly susceptible to degenerative processes in the connective tissue and that, in some cases, these changes may be only incidental to various inflammatory processes in this location. Leukoplakia of the vulva (clinically whitish patches) may be produced either by degenerative processes in the connective tissue, maceration of a hyperkeratotic epidermis, or a combination of the two. Leukoplakia of the vulva (histologically acanthosis and hyperkeratosis) probably is frequently superimposed on various pathologic processes of the vulva whether primarily of a degenerative or an inflammatory nature.

Treatment of Vaginitis with Estrogenic Substance.—Davis observed that the use of an estrogenic substance, amniotin (Squibb), in the treatment of senile vaginitis rapidly restores the normal adult epithelium seen during active sex life. The simple restoration of the epithelium leads to a healing of the ulcerated areas, a disappearance of the inflammatory symptoms, a cessation of the adhesive manifestation and a complete disappearance of all symptoms. No undesirable effects have been noted, nor can they occur during the postmenopausal period. Although the vaginal mucosa reverts to the normal senile type, the symptoms do not recur. Interesting biopsy specimens showing all the changes initiated by the estrogenic substance in the vaginal mucosa are presented. The treatment is simple, inexpensive and entirely feasible. The biopsy method of study can be used as an aid in all endocrine studies in the human female.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Anæsthesia, Manchester

13: 1-40 (Oct.) 1935

Second Embley Memorial Lecture Delivered at Melbourne University. Z. Mennell.—p. 3.

*Paraldehyde Idiosyncrasy: Report of Case. G. Brown.—p. 25.

Anesthesia: Its Present and Future. W. S. Sykes.—p. 28.

Idiosyncrasy to Paraldehyde.—Brown reports a case of paraldehyde idiosyncrasy in which prolonged deep unconsciousness took place after a dose of only 4 drachms (16 Gm.). There was complete loss of reflexes, even that of the eyes to light and the corneal reflex, very little depression of blood pressure, rapid respiration, rise of temperature, diminished air entry at bases and probably paraldehyde idiosyncrasy combined with some collapse of the bases of the lungs.

British Journal of Radiology, London

8: 669-732 (Nov.) 1935

Leukocytic Variations in Radium Workers (Part I). D. R. Goodfellow.—p. 669.

Distribution of Radiation in Deep X-Ray Therapy. H. M. Parker and Joan Honeyburne.—p. 684.

Rare Cause of Intracranial Calcification: Tuberose Sclerosis. C. Macdonald.—p. 697.

Measurement in Röntgens of Distribution in Water of Intensity of Radiation from a 3 Gm. and a 4.9 Gm. Radium Unit. L. G. Grimmett and J. Read.—p. 702.

Two Unusual Aneurysms. P. Kerley.—p. 714.

Effect of High Frequency Field on Experimental Rat Tumors, with Especial Reference to So-Called Specific Effect. H. J. Taylor.—p. 718.

Further Note on Speedier Production of Finished Radiograph. A. E. Barclay.—p. 722.

Edinburgh Medical Journal

42: 569-632 (Nov.) 1935

Histologic Study of Normal Mamma in Relation to Tumor Growth: II. Mature Gland in Pregnancy and Lactation. E. K. Dawson.—p. 569.

*Pneumonia and Other Common Respiratory Conditions in the New-Born: Clinical Study. W. S. Craig.—p. 599.

Pneumonia in Infants.—Craig correlates the clinical and pathologic results of 146 necropsies on new-born infants presenting some of the common respiratory conditions. In many infants the lungs are healthy and well expanded, simple atelectasis is a frequent observation, bronchitis occasionally occurs alone, and consolidation is common and may result from pneumonia or/and hemorrhage. Inflammation and hemorrhage are frequently found in atelectatic tissue. Respiratory conditions are particularly prone to occur in premature infants and children born severely asphyxiated; they are frequently associated with cerebral hemorrhage. A "ratchet" or "cogwheel" element in the breathing is sometimes heard over atelectatic tissue and when present is diagnostic of the condition. Bronchitis is much less common than pneumonia; the physical signs may be extremely localized, but they do not differ from those present at other age periods. Recovery occurs in mild cases, which usually have a febrile course. Pulmonary consolidation can be diagnosed during life in a large number of cases, but it is not possible to determine whether it is the result of pneumonia or intrapulmonary hemorrhage. Crepitations of a peculiarly fine, crackling nature can be heard over the affected tissues in the majority of cases of pneumonia or intrapulmonary hemorrhage; they are diagnostic of consolidation and are not found in other respiratory conditions of the new-born. Periodic attacks of cyanosis are constant in cases of pulmonary consolidation; administration of oxygen results in an appreciable improvement in color. Attacks of cyanosis occurring in other neonatal conditions (intracranial hemorrhage, urinary infection, septicemia, atelectasis) are not influenced to the same extent by oxygen administration. The prognosis in cases of pulmonary consolidation is grave; the majority die within a few days of diagnosis. Three cases are described in which clinical examination led to a diagnosis of pneumonia and eventual recovery. They differed from fatal cases in that they all showed continued high fever.

Indian Medical Gazette, Calcutta

70: 541-600 (Oct.) 1935

Ringworm of the Scalp in India. N. C. Dey and P. A. Maplestone.—p. 541.

Some Observations on Dermal Leishmaniasis. R. O. A. Smith and K. C. Holder.—p. 544.

Nerve and Cord Degeneration Referable to Vitamin A Deficiency. L. Nicholls.—p. 550.

Lumbar Sympathectomy in Treatment of Circulatory Diseases. M. M. Cruickshank.—p. 553.

Some Unusual Acute Abdominal Conditions. P. N. Ray.—p. 554.

Hill Malaria. C. Strickland.—p. 559.

Journal of Mental Science, London

81: 489-754 (July) 1935

Resemblance of Twins with Regard to Perseveration. Ella Pratt Yule.—p. 489.

Fate of One Hundred and Fifty Psychiatric Outpatients. I. Skottowe and Madeline R. Lockwood.—p. 502.

*Investigation into After-History of Ninety Patients Discharged from Mental Hospital Against Advice. L. Minski.—p. 509.

Experimental Studies on Connection of Schizophrenia and Tuberculosis. A. Beck, W. Ogden and M. Whelen.—p. 514.

Agglutinations of Bacillus Coli by Serum of Psychotics, Especially of Schizophrenics. A. Beck, W. Ogden and M. Whelen.—p. 524.

Serum Calcium and Sodium in Some Psychotic Disorders. A. H. Tingey and S. W. Hardwick.—p. 528.

Studies on Influence of Emotions on Functions of Organs (Including Observations in Normals and Neurotics). E. Wittkower.—p. 533.

Patients Discharged from Mental Hospital Against Advice.—Minski states that of ninety patients who left the Maudsley Hospital and went home against advice seventeen cannot be traced, twenty-five are in mental hospitals, twenty-four have recovered, sixteen are at home no better, seven committed suicide and one died at home. Obviously the standards of behavior determine the relatives in taking patients home, and for this reason the largest number taken home while still ill were suffering from depressive states in which behavior likely to lead to conflict with the environment is not marked. It seems necessary to urge relatives of patients suffering from severe depressive states to send them to suitable hospitals. Most of the patients suffering from depressive states who remain at home, although ill, are of the involutional type, and only two who might reasonably be expected to recover remain ill in difficult home situations. The relatives seem to take a more serious view of states with excitement; only four manic patients and three with toxic confusional states were taken home while excited; no unrecovered schizophrenic patients remain at home.

Lancet, London

2: 927-986 (Oct. 26) 1935

Some Epochs in Medical Research. H. Dale.—p. 927.

*Agranulocytosis: Meningitic Symptoms with Changes in Cerebrospinal Fluid in Case of Relapsing Type. K. Goadby and C. Worster-Drought, with report on cerebrospinal fluid by W. E. C. Dickson.—p. 933.

Appendicitis in the Aged. H. Taylor.—p. 937.

Surgery in Treatment of Primary Skin Carcinoma. H. T. Simmons.—p. 938.

Agranulocytosis with Meningitic Symptoms.—Goadby and Worster-Drought discuss the occurrence of meningitic symptoms in a case of agranulocytosis in which the cerebrospinal fluid was examined. Opportunity was afforded also for chemical and histologic examination of the blood during the prodromal period of a relapse. The diagnosis of agranulocytosis was made during an illness that started in April 1934 with vomiting, pyrexia and ulceration of the gums. After a few weeks the more acute symptoms yielded to injections of pentnucleotide, but there were subsequent relapses in May, June, September and December 1934, and a severe one toward the end of February 1935. It was during this last attack that definite meningitic symptoms—drowsiness, rigidity of the neck and Kernig's sign—were first observed. Each of the previous relapses had been ushered in with pyrexia, languor and prostration, but no physical signs indicating involvement of the nervous system were detected. During each relapse the granulocytes fell to a very low level; the spleen was palpable and abnormal signs—dulness and crepitations—appeared at the base of the left lung. At no time during the entire course was Bacillus fusiformis or Vincent's spirochete detected in films from the ulcers of gums, throat or tongue.

Presse Médicale, Paris

43: 1649-1664 (Oct. 23) 1935

*Weltmann's Serum Coagulation in Clinic. G. Carrière, P. Martin and A. Dufossé.—p. 1649.
Study of Pigmentation in Alopecia Areata. F. Woringer and R. Thée. —p. 1652.
*Scleroderma with Sclerodactylia Treated by Cervical Sympathectomy. D. Pletneff and T. Plotkin.—p. 1653.

Weltmann's Serum Coagulation.—For eight months Carrière and his co-workers studied the serum coagulation reaction of Weltmann in various diseases. The principle of the method is to place constant quantities of blood serum in the presence of increasingly strong solutions of calcium (or barium) chloride, running from 0.1 to 1 per thousand. The reaction is read after the tubes have been removed from the warm water bath. They may be clear or show a simple opalescence or a flocculation. The result, which measures the heat coagulation of serum in the presence of calcium ions of growing concentration, allows the determination of the so-called band of coagulation. This band may be increased or diminished. Its increase is in general associated with a fibrous process and its decrease with an inflammatory one. According to the authors' experience, the band is increased in tuberculosis when the process is fibrotic and is diminished when it is exudative or pneumonic. In chronic rheumatism the reaction is helpful in diagnosis and prognosis for the same reasons. In hepatic disorders, especially cirrhosis, the increase in the band appears constant. The band appears decreased in the majority of cancer cases. Finally in exudates and transudates the band is decreased as in inflammatory conditions. The authors feel that this reaction offers additional help to that provided by other laboratory tests.

Scleroderma Treated by Sympathectomy.—Pletneff and Plotkin report a case of scleroderma with sclerodactylia which responded well to cervical sympathectomy. They believe that the sympathectomy acts on the function of the parathyroids and diminishes calcemia. Periarterial sympathectomy of the arteries of the arm in cases of scleroderma associated with involvement of the upper extremities and sclerodactylia gives no result and it is necessary to attack the stellate ganglion directly.

43: 1689-1704 (Oct. 30) 1935

*Cancer of Colon: Atypical Onset. M. Chiray and Georges-Rosanoff. —p. 1689.
Facilities and Difficulties of Diagnosis of Duodenal Ulcer. R. A. Gutmann and G. Voulpiotis.—p. 1691.

Cancer of Colon: Atypical Onset.—Chiray and Georges-Rosanoff discuss the various types of atypical onset of cancer of the colon. It is sometimes manifested by a prolonged febrile state without any localizing symptoms. This form is not well known. Sometimes it sets in with intestinal symptoms without the characteristics of cancer. This may resemble appendicitis, intestinal tuberculosis, simple colitis, or diverticulitis. Sometimes the onset may take on the aspects of an extra-intestinal disorder, such as gallbladder disease, hepatitis, simple dyspepsia, urinary manifestations and, in women, genital conditions. The practical conclusion that can be drawn from this discussion is that one should not hesitate to make repeated roentgen examinations, since colonic cancer cannot be eliminated on the strength of one negative examination.

Pediatria, Naples

43: 1201-1296 (Nov. 1) 1935

Infantile Hypotonia. G. Suranyi.—p. 1201.
Anatomopathologic and Clinical Considerations of One Hundred Necropsies on Premature Children. F. Pontieri.—p. 1212.
Treatment of Favism. A. Chieffi.—p. 1220.
*Intolerance to Milk and Its Treatment with Injections of Milk. A. Beverini.—p. 1227.
Laryngeal Tuberculosis: Two Cases. G. Murano.—p. 1254.
Possibility of Cure of Tuberculous Meningitis. L. Sertoli.—p. 1267.

Treatment of Intolerance to Milk.—In discussing the pathogenesis of sensitivity to milk, Beverini states that digestive disturbances occurring in infants are a manifestation of anaphylaxis. He advocates subcutaneous injections of milk. The milk injections are specific: breast milk vaccinates against breast milk only and cow's milk against cow's milk only. The symptomatology of the condition consists in vomiting after feedings, obstinate constipation, fatty stools, eczema and impetigo. When cow's milk is injected the temperature rises for several hours, sometimes for as many as ten hours. This does not occur when breast milk is administered. An injection of breast milk produces a slight erythematous reaction that disappears in the course of one or two days, whereas that of cow's milk produces a marked erythematous reaction. The author reports on two infants, aged 16 and 8 days, respectively. The children were treated with progressive doses of breast milk heated to 110 C. for twenty minutes. Preliminary doses of 1 cc. and 2 cc. of milk were injected subcutaneously one hour apart and were followed by a dose of 5 cc. injected subcutaneously into the flank. After the third injection, from 5 to 10 cc. of milk was injected every other day. The treatment was well tolerated. After four months of milk injections, the first child showed great improvement, but an acute intercurrent gastro-enteritis set in suddenly with a fatal result. The other child presented deficient assimilation of food and abnormal amounts of fat in the feces. Dyspepsia aggravated the intolerance to milk. Under treatment the general condition improved. The child became more lively, had more color and gained weight. The feces lost their dyspeptic character, indicating that the assimilation of fats had improved.

Riforma Medica, Naples

51: 1501-1540 (Oct. 5) 1935

*New Sign for Diagnosis of Pleural Effusion. L. D'Amato.—p. 1503.
Autohemotherapy in Arterial Hypertension. G. Pizzillo.—p. 1505.
Takata Test in Diseases of Extrahepatic Biliary Tract. G. Manzoni. —p. 1508.

New Sign for Diagnosis of Pleural Effusion.—D'Amato states that, in patients with pleural effusion, there is an area of dulness on the segment of the vertebral column near the posterior costomediastinal sinus of the pleura. The sign that he describes for the diagnosis of pleural effusion consists in the displacement of the dulness from the vertebral segment to the cardiac area, when the patient changes from the sitting position to the lateral decubitus and lies on the side opposite that in which the pleural effusion is located. The displacement of the vertebral dulness is due to the passage of the pleural fluid from the posterior to the anterior costomediastinal sinus of the pleura during the change of position of the patient. The dulness of the cardiac area increases on both sides. Its increase on the side on which the patient lies is due to the gravitational displacement of the heart and on the opposite side to the new location of the pleural fluid in the anterior costomediastinal sinus of the pleura.

Prensa Médica Argentina, Buenos Aires

22: 2003-2050 (Oct. 16) 1935

*Diagnostic and Prognostic Test for Diseases of the Subhepatic Crossway. M. Zinny.—p. 2003.
Heart and Anasarca in Myxedema. A. O. Raffo and A. Ruiz Moreno. —p. 2009.
Constitutional Type Observed in Middle West of Argentina. J. M. Nágera.—p. 2014.
Fibroma of Uterus: Two Hundred and Ten Cases with Operations. E. B. Ries and R. M. Bueno.—p. 2020.

A Test for Liver Function.—Zinny reports a test for functions of the liver and of the biliary tracts, the results of which indicate whether an operation, especially cholecystectomy, should be performed on patients suffering from diseases of the liver or the biliary tract. It determines the amount of azorubin in the duodenal secretion, which is collected by means of duodenal tubage during the first hour of elimination of the dye that follows the intravenous injection of 4 cc. of a 1 per cent solution of azorubin. The determination is made by identifying the color of the duodenal secretion in a tube with that of a mixture of a 1 per cent solution of azorubin and ammonium picrate (of the color of the C bile) in the control tubes that form the colorimetric scale, previously prepared with twenty tubes, numbered from 1 to 20, each containing increasing quantities of from 0.05 to 1 cc. of the 1 per cent solution of azorubin and decreasing quantities of from 4.95 to 4 cc. of the solution of ammonium picrate. The colorimetric scale corresponds to concentrations of from 0.001 to 0.02 Gm. of azorubin in the duodenal secretion. If the liver and the biliary tract are normal,

the dye appears in the duodenal secretion within fifteen and thirty minutes after the injection. Its elimination lasts about three hours. The normal hourly elimination ranges between 0.01 and 0.018 Gm. of the dye, 0.01 Gm. being considered the lower normal limit. An elimination of 0.008 Gm. indicates incipient impairment of the liver but does not contraindicate operation; 0.006 Gm. makes operation inadvisable for the time being but may improve with treatment, and the operation can be performed when the results of the test, repeated at intervals of five or eight days, are better. An elimination of 0.005 Gm. indicates grave liver or biliary insufficiency that prevents operation, except in cases of emergency. Even in such cases it is dangerous in spite of the intensified preoperative and postoperative care of the patient. An elimination lower than 0.003 Gm. an hour indicates too serious an involvement of the liver and biliary tract to operate. The author states that the test is harmless, has no contraindications, is of a simple technic and may be repeated whenever necessary.

Deutsches Archiv für klinische Medizin, Berlin

178: 89-216 (Oct. 6) 1935. Partial Index

*Hemolytic Hypersplenia: Acquired Hemolytic Icterus. L. Heilmeyer.—p. 89.
Indican Tolerance as Functional Test of Renal Function. P. Schlierbach.—p. 103.
Experimental Nycturia. A. Jores.—p. 109.
Pathologic Physiology and Clinical Aspects of Atrioventricular Dissociation. I. Oettinger.—p. 117.

Hemolytic Hypersplenia.—Heilmeyer separates from the group of disorders collectively designated as acquired hemolytic icterus a definitely defined disease entity; namely, hemolytic hypersplenia. The symptoms of this disorder are severe hemolytic anemia with considerable increase in the blood exchange (reticulocytosis of from 100 to 400 per thousand and urobilin elimination in feces of from 700 to 3,000 mg.), absence of hepatic changes, absence of bilirubinuria, reduction of osmotic resistance, microspherocytosis, splenic tumor, sudden onset of the disorder and lack of symptoms of congenital hemolytic icterus in the anamnesis, absence of constitutional hemolytic signs, absence of similar disturbances among the relatives, and cure of the hemolytic anemia with complete disappearance of the reduction in the resistance and of the microspherocytosis following splenectomy. From the complete reversion of the biologic and morphologic changes in the erythrocytes after splenectomy the author concludes that this acquired disorder is not a disease of the bone marrow or of the erythrocytes but rather of the spleen. This is borne out also by a comparison of the measurements of the erythrocytes in the splenic artery and in the splenic vein. It reveals that in passing through the spleen the erythrocytes become thicker and simultaneously their spherical diameter becomes reduced (microspherocytosis). Although there are as yet only isolated cases with this aspect, they nevertheless throw some light on the process of splenic hemolysis in this disorder. The author suggests an investigation of this problem in cases of congenital hemolytic icterus. In discussing the etiology of hemolytic hypersplenia, he calls attention to the significance of severe infections. It is possible that severe disturbances in the endocrine correlations may likewise play a part in the etiology, for the author cites a case of hemolytic anemia with splenic tumor which developed after a severe thyroid and hypophyseal disturbance.

Klinische Wochenschrift, Berlin

14: 1593-1632 (Nov. 9) 1935. Partial Index

Occurrence of Iminazol Bodies in Gastric Juice. F. Oefelein.—p. 1599.
*Especially Intense Action of Estrogenic Substance in Vaginal Instillation. M. Berger.—p. 1601.
Lactic Acid Elimination in Urine in Premature and Full-Term Nurslings. H. Seckel and W. Sommer.—p. 1602.
Formation of Biliary Calculi. A. von Kúthy.—p. 1605.
Calcium Resorption and Calcium Retention in Various Diets. E. Hesse and Charlotte Barndt.—p. 1607.
*Histamine in Treatment of Allergic Conditions (Bronchial Asthma, Urticaria). A. Dzsinich.—p. 1612.

Action of Estrogenic Substance Applied in Vagina.—Berger says that in studies on the resorption capacity of the skin of rats for estrogenic substance it was decided to determine the efficacy of estrogenic substance in case of direct application to the vaginal mucous membrane. It was found that this instillation required much smaller quantities for elicitation of estrus than did subcutaneous administration. The experiments were made on adult, castrated rats. The author states that 0.05 cc. of fluid can readily be instilled into the vagina of the rat by means of a thin ureteral catheter and an especially calibrated record syringe. An ampule containing 100 mouse units of estrogenic substance was diluted in the required manner and 0.05 cc. of fluid was instilled five times in the course of thirty-six hours. By dilution of the extract and by repeated injections it was possible to avoid the sources of error that are involved in the use of extremely small doses. It was found that, in vaginal application, 0.5 mouse unit was sufficient to elicit estrus in rats, whereas in the case of subcutaneous administration more than 6 mouse units was required. In the estrus that was produced by instillation, noncornified epithelia were often found among the cast-off, non-nucleated horny lamellae. In this respect this type of estrus differs from that produced by the subcutaneous administration of estrogenic substance.

Histamine in Treatment of Allergic Conditions.—Dzsinich calls attention to the great similarity between histamine shock and anaphylactic shock and points out that on the basis of this observation it was assumed that histamine plays a part in allergic conditions. The investigations that were made in connection with this hypothesis corroborated the assumption of the important rôle of histamine in the allergic reaction; namely, of the histamine that is liberated by the cells in the sensitized organism. It is assumed that in asthma histamine is liberated by the vascular cells of the bronchi, in urticaria by those of the skin, in hay fever by those of the nasal mucous membrane and in migraine and epilepsy by the vascular cells of the brain. The histamine and histamine-like substances thus liberated supposedly elicit endogenously the local and general symptoms of these disorders. If this stand is taken, it seems justified to assume that allergic persons can de desensitized against this endogenously produced histamine by the exogenous introduction of small doses of histamine. The author decided to try this therapy in fifteen cases of bronchial asthma and in three cases of urticaria. In severe cases he began with 0.00001 mg. of histamine, in the milder ones with 0.0001 mg. The first injection was given intracutaneously and, when it caused no noticeable reaction, the same dose was given subcutaneously on the following day. Later, the injections were given at intervals of two days. In a few cases the daily treatment was tried but was found inadvisable. The doses were gradually increased, but the author advises against their being increased beyond 0.01 mg. A table shows that this maximum dose is reached in severe cases after the twelfth and in milder cases after the ninth injection. Quite frequently, ten or twelve injections resulted in complete disappearance of the symptoms, but in other cases up to thirty injections were required. Summarizing his results the author says that, with a suitable technic and an individualized dosage, histamine treatment may produce permanent and satisfactory results in bronchial asthma as well as in urticaria. Although he had some failures in his rather small material, he nevertheless considers the method worthy of further trial.

Medizinische Klinik, Berlin

31: 1453-1484 (Nov. 8) 1935. Partial Index

Danger of Infection from Children with Masked Elimination of Tubercle Bacilli. G. Zederbauer.—p. 1458.
*New Symptom for Differentiation of Diaphragmatic Hernia from Diaphragmatic Relaxation. W. Böhme.—p. 1460.
Tuberculosis in Persons of Advanced Age. A. Albrecht.—p. 1461.
Anaphylactic Spring Edema of Lung. D. Engel.—p. 1466.
Pathologic Anatomic Aspects of Artificial Respiration in Death from Drowning. D. Schenke.—p. 1466.

Differentiation of Diaphragmatic Hernia from Diaphragmatic Relaxation.—Böhme points out that on the basis of a roentgenoscopy it is frequently difficult to determine whether the arched shadow in the right thoracic space represents the liver that has passed through a diaphragmatic cleft, or whether the liver together with the diaphragm has become elevated because of a relaxed diaphragm. In the left side of the thorax the same doubt may apply with regard to the stomach. More-

over, the paradox motility that is usually cited in support of the diagnosis of diaphragmatic paralysis is observable also in case of traumatic diaphragmatic hernia, when large portions of the abdominal viscera have ascended into the thorax. After pointing out that the isolated electrical irritation of the phrenic nerve as well as kymographic tests are of no value in the differentiation, the author stresses the importance of this differentiation, stating that, although relaxation of the diaphragm resulting from phrenic paralysis is frequently irreparable, diaphragmatic tears are amenable to surgical repair. It is therefore desirable to know of a reliable symptom that permits definite differentiation. The author calls attention to an esophageal-diaphragmatic phenomenon suitable for this purpose. He shows that the constriction phenomenon elicited by the contracting diaphragm on the esophagus at the esophageal hiatus is helpful in testing the function of the diaphragm and in determining the localization of the diaphragm in otherwise obscure topographic conditions. This constriction appears also when the abdominal muscular pressure is exerted. It frequently is lacking or considerably reduced in case of paralysis of one side of the diaphragm. If there is a suspicion of a tear in the diaphragm and of displacement of abdominal organs into the thorax, and if in this case a constriction of the esophagus at the hiatus develops in response to a unilateral electrical irritation of the phrenic nerve, it denotes diaphragmatic hernia and contradicts diaphragmatic relaxation.

Münchener medizinische Wochenschrift, Munich

82: 1749-1784 (Nov. 1) 1935. Partial Index

Comparative Therapy of Whooping Cough. A. Knorr.—p. 1750.
Spontaneous Pneumothorax. E. Schott.—p. 1751.
Refractory Case of Kala-Azar (Internal Leishmaniasis). J. P. Naab.—p. 1756.
*Cure of Syphilis with Spirochetal Vaccine. Hilgermann.—p. 1760.
Experiences in Treatment of Suppurating Anginas with Bismuth Preparation. Stiehr.—p. 1761.

Cure of Syphilis with Spirochetal Vaccine.—Hilgermann states that he has demonstrated that the efficacy of chemotherapy is not the result of its sterilizing effect but rather of an immunizing action. To be sure, the chemotherapeutic effect is based on the parasitotropic action of chemical substances, not in the sense of a sterilization but rather in the sense of a killing of some of the pathogenic organisms, the liberated toxins of which present an adequate specific stimulus for the elicitation of an active immunization. The chemical substance neutralizes the endotoxins of the pathogenic organism, and the neutralized toxins stimulate the formation of defense substances. The chemotherapeutic agent arsphenamine fulfils its parasitotropic action completely if a sufficient amount of protective substances are present in the organism. This was proved by several investigators in cases in which chemical substances could not be administered at first. After a preliminary immunization, a few doses of arsphenamine were sufficient to make all reactions negative. The author cites one investigator who, on the basis of observations in 225 cases, reaches the conclusion that in patients who have undergone preliminary treatment with spirochetal vaccine the manifestations of early syphilis are made to disappear by chemotherapeutic substances with unequaled rapidity. If the cure of early syphilis requires the presence of considerable quantities of protective substances, this is even more important in chronic infections. The administration of spirochetal vaccines makes it possible to compensate for the deficiency of protective substances in the organism. After this immunization the organism alone is able to counteract the infection or the chemotherapeutic substances are more effective. The author shows that the vaccine therapy of syphilis has become practical since he succeeded in the mass culture and in the production of avirulent cultures of Spirochaeta pallida. He maintains that this immunization either alone or in combination with chemotherapy will produce a cure of the syphilitic infection and the prevention of the late sequels of syphilis, the latter aim not being satisfactorily achieved with chemotherapy alone. He shows that the spirochetal vaccine can be used also as a test substance in order to detect inactive foci in latent cases and points out that the negative Wassermann reaction is not sufficient proof of a complete cure and that in the future the negativity of that reaction together with the lack of manifestations following vaccination with spirochetal vaccine will be required as a proof of complete cure.

Wiener klinische Wochenschrift, Vienna

48: 1343-1374 (Nov. 1) 1935. Partial Index

Serum Protein Bodies in Hepatic Diseases. H. Kaunitz.—p. 1349.
Physiologic Fetal Forced Position and Its Significance for Development of Congenital Deformities. F. Bauer.—p. 1352.
*Determination of Age on Roentgenograms of Aorta of Living Persons and By Means of Geometrical Method of Measurement After Death. S. Kreuzfuchs.—p. 1355.
*Abderhalden's Incretory Reaction in Hyperthyroidism. M. Schacherl.—p. 1356.
Occupational Skin Diseases. M. Oppenheim.—p. 1359.

Determination of Age by Roentgenography of Aorta.—Kreuzfuchs maintains that the increase in the diameter of the aorta from birth to the age of 70 conforms to a certain law. For the period between the ages of 20 and 70, he was able to determine with his aortico-esophageal distance method that the diameter of the so-called arch of the aorta is 20 mm. at the age of 20 and thereafter increases each decade by 2 mm. At the age of 70 it equals 30 mm. Measurements on 200 persons revealed that this method gives correct results in 90 per cent of the cases. The author points out that his method as well as several others, although they can be employed on the living patient, are not suitable for postmortem examinations. For this reason he devised a method that permits a mathematically exact measurement of the aorta. He explains his formula on a diagram and gives an example of the computation. He shows that it is not only more simple but also more exact than his other method and that it can be used by anatomists and in legal medicine.

Abderhalden's Incretory Reaction in Hyperthyroidism.—After pointing out that Abderhalden's incretory reaction has been entirely rejected by some and has been accepted by others only with considerable reservations, Schacherl relates the observations he made with this test in patients with hyperthyroidism. He concedes that different examiners frequently obtain different results and that the Abderhalden test involves sources of error. Nevertheless, he thinks that the errors can be reduced to a minimum and that the results of the test will eventually be more valuable than the determination of the basal metabolism, emphasizing that the latter has been overestimated. He points out that the physical aspects of patients with endocrine disturbances are important, since they often give indications of the type of the disturbances. In view of the fact that the Abderhalden incretory reaction indicates the existence of a disorder in the examined gland but does not reveal whether the disturbance is a hyperfunction or a hypofunction, it seems desirable to determine the type of the disorder by clinical observation. The physical aspects of incretory disturbances are especially noticeable in female patients, so that the outcome of Abderhalden's incretory test can frequently be estimated in advance. Nevertheless, the reaction complements the clinical observations considerably. The results of the reaction are recorded in a table. From these results it is evident that the disturbances, which are considered of a hyperthyroid nature, are really polyglandular, with a predominance of the symptoms known as hyperthyroidism. The involvement of the various endocrine organs differs in the individual cases. Especially great is the involvement of the thymus, the gonads and the anterior hypophysis. Moreover, the clinical picture indicates an involvement of the mammary glands. In discussing the therapeutic significance of the Abderhalden incretory reaction the author shows that, in cases in which neither the thyroid nor the thymus was decomposed in the reaction, thyroid should be administered only when gonadal and anterior hypophyseal hormones are likewise required. Without this combination, the administration of thyroid should be dispensed with and only thymus should be given. However, the simultaneous administration of thyroid and thymus is never indicated. In the conclusion the author points out that Abderhalden's opinion, namely, that the decomposed organ should be compensated by its hormone, would have proved erroneous in the cases here investigated, and he stresses that the clinical use of the reaction is possible without the exact knowledge of the chemical processes that are involved.

Zentralblatt für Chirurgie, Leipzig

62: 2657-2704 (Nov. 9) 1935. Partial Index

*Cardiodysis: A New Operation for Treatment of Cardiospasm. G. Lotheissen.—p. 2658.

Do Late Disorders Develop After Use of Petz's Suturing Apparatus in Gastric Resections? O. Schürch.—p. 2660.

Conservativism in Case of Retarded Callus Formation with Pseudarthrosis. A. Lorenz.—p. 2662.

Cervical Echinococcus with Rare Localization. M. Mátyás.—p. 2667.

Operation for Treatment of Cardiospasm.—According to Lotheissen, most cases of so-called cardiospasm yield to nonsurgical dilation, for among about 120 cases he found only two in which more radical interventions became necessary. In one of these cases he did the cardioplasty according to von Hacker and obtained good results. The second patient, a woman aged 52, had a dilatation of the esophagus and a severe cicatricial stenosis (probably the result of ulcerations). It was decided that the stenosis had to be excluded and that a new connection with the stomach had to be formed. After mentioning the shortcomings of the methods usually employed in such cases, the author describes a new technic that he employed. The abdominal cavity was opened in the midline. Following division of the peritoneum at the diaphragm, the esophagus could be readily detached and drawn down for about 8 cm. It was then again attached to the diaphragmatic cleft with button sutures. After that it was turned so that the posterior wall could be seen. A fold of the fundus portion of the stomach was lifted and attached to the dilated portion of the esophagus, above the stenosed part, by means of two rows of button sutures. Then the esophagus was again turned back so that the anterior wall was exposed, and an elastic Doyen clamp was put on it directly anterior to the diaphragm. The ectasia had been well irrigated, but in order to make sure that there could be no escape of contents the surroundings were well covered with compresses. Then the entire constricted portion (4 cm. in length) was incised down to the lumen and the mucous membrane was immediately attached all around to the external wall by means of button sutures; that is, a sort of cardiotomy was made, but intentionally also through the mucous membrane. Then followed the intussusception of the constricted portion into the stomach and the attachment of an anterior fold, which on both sides was joined to the posterior fold with a double suture, to the dilated esophagus. By this the cut portion was completely buried. In order not to impair the sutures and yet to insure proper nutrition of the greatly weakened and emaciated patient, a gastric fistula was made. The author points out that since the disorder is always designated as cardiospasm, even if the stenosis is at the diaphragm, his operation can be designated as cardiodysis (intussusception of the cardia). He thinks that cardiodysis is advisable especially for cicatricial stenoses. The covering with folds greatly reduces the danger of infection. Considerable dilatation of the esophagus is of course a prerequisite for this intervention.

Klinicheskaya Meditsina, Moscow

13: 1103-1256 (Aug.) 1935. Partial Index

Biotropism and Resistance in Syphilis. K. M. Ishevskiy.—p. 1125.

Variability of Microbes and Its Significance in Infectious Diseases. I. S. Bomshtein.—p. 1137.

*Acute Appendicitis in the Aged. F. S. Korganov and A. P. Krapivina. —p. 1142.

Syphilitic Epilepsy. E. M. Vizen.—p. 1176.

Diathermy Therapy of Genuine Epilepsy. V. V. Isaev.—p. 1186.

Acute Appendicitis in the Aged.—Korganov and Krapivina state that, between 1928 and 1933, 1,670 cases of acute appendicitis were treated at the Hospital Semashko in Moscow. Of these, 1,638, or 98.1 per cent, comprised patients ranging in age between 10 and 50, while thirty-two, or 1.9 per cent, were past 50. The authors summarize their study of the thirty-two cases as follows: 1. The peculiarities of the clinical course of acute appendicitis in old people conditioned by the weak reaction of the organism. Persons with generalized arteriosclerosis react poorly or not at all to local inflammatory manifestations. Systemic reaction, as expressed by temperature and pulse, may be absent until the development of peritonitis. 2. The atypical picture of acute appendicitis of the aged is responsible for errors in diagnosis, late recognition and a high incidence of complications. 3. Operation should be performed in all cases of acute appendicitis in the aged as soon as the diagnosis is established. Expectant treatment is permissible in the case of abscess. 4. Because of alterations in the cardiovascular and respiratory systems of the aged, the use of general narcosis should be reduced to a minimum. 5. The authors advise the removal of the appendix except when the presence of an abscess complicates the procedure. 6. The incision is to be closed without drainage except in the cases in which the focus of infection cannot be removed or in the presence of parenchymatous oozing from the bed of the removed appendix. 7. The postoperative treatment calls for especial attention to the status of the cardiovascular, the respiratory and the intestinal tracts. 8. Mortality in the cases in which operation was performed in the early stage is not high (about 0.5 per cent); in the late and the complicated cases it reaches from 30 to 50 per cent.

13: 1257-1420 (Sept.) 1935. Partial Index

*Analysis of Cardiovascular Disease on Constitutional Basis. M. V. Chernorutskiy and F. M. Ganskay.—p. 1307.

Grave Disturbances of Myocardial Blood Supply Occasioned by Functional Disorders of Coronary Circulation. D. M. Grotel.—p. 1314.

Symptoms of Myocardial Abscess. A. A. Gerke.—p. 1332.

Diagnosis and Symptoms of Sclerosis of Pulmonary Artery. L. M. Georgievskaya and N. V. Potte.—p. 1342.

*Skin Reaction to Streptococcus Toxins in Rheumatic Disease. A. V. Kaminskaya and I. T. Teplov.—p. 1363.

Cardiovascular Disease.—Chernorutskiy and Ganskay analyzed 935 cases of cardiovascular disease with special attention to distribution according to constitutional types. There were 501 male and 434 female patients. Distribution according to age was as follows: up to the age of 20 years 5.2 per cent, between 20 and 30 years 24.2 per cent, between 31 and 40 years 20.2 per cent, from 41 to 50 years 20.8 per cent, and over 51 years 29.6 per cent. Rheumatic lesions such as endocarditis and valvular disease gave the highest incidence in their series, 46.7 per cent. The next in frequency was the arteriosclerotic type with an incidence of 34.85 per cent, while syphilitic disease of the vascular system gave an incidence of 9.8 per cent. These relationships varied with the age, sex and constitutional type. The rheumatic form was more frequent in the young, the female and the asthenic type, while the arteriosclerotic and syphilitic forms predominated in the adult, the male and the hypersthenic constitution. Distribution of pathologic types in the hypersthenic patients was as follows: arteriosclerotic in 61.5 per cent, syphilitic aortitis in 11.5 per cent, rheumatic in 23 per cent and miscellaneous in 4 per cent. The normasthenic type gave an incidence of rheumatic lesion in 48.25 per cent, arteriosclerotic in 31.25 per cent, syphilitic in 10.5 per cent and miscellaneous in 10 per cent. The asthenic group showed the greatest tendency to rheumatic heart disease, 74.1 per cent, and the least tendency to arteriosclerotic, 14.3 per cent. Syphilitic aortitis occurred in 3.6 per cent, miscellaneous in 8 per cent. It is evident from these figures that the hypersthenic patients are four times as prone to the arteriosclerotic and three times to the syphilitic type as the asthenic patients, while the incidence of the rheumatic forms is only one-third that occurring in the asthenic type.

Skin Reaction to Streptococcus Toxins in Rheumatic Disease.—Kaminskaya and Teplov report 62 per cent of positive reactions to intradermal injections of Dick's streptococcus toxin in cases of acute rheumatic infection with joint involvement. The response in nonrheumatic or nonallergic diseases was positive in 20 per cent. There were four positive reactions in a group of twelve cases of a pure cardiac form of rheumatism without joint involvement. The reaction was negative in all of ten cases of endocarditis septica lenta. The positive reaction to Dick's toxin in acute rheumatic disease may persist as such for three or four months. Salicylate therapy leads to earlier disappearance or to diminution of the intensity of the reaction. Simultaneous injection of the streptococcic endotoxin (nucleoprotein) in the positive cases gave a positive reaction in 46 per cent, while injection of the exotoxic component of Dick's toxin gave a positive reaction in 16 per cent only. The authors conclude that skin reaction to Dick's toxin because of its inconstancy cannot serve as an index of rheumatic infection. A certain amount of scientific and practical interest attaches to it, however, because it is observed more frequently in rheumatic than in nonrheumatic diseases and because it displays a certain dependence on the course of the disease.

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78: 1001-1028 (Sept. 24) 1935

*Otto's Disease and Other Forms of Protrusion of Acetabulum: (Primary Juvenile Osteo-Asthenic Protrusion and Secondary Protrusions.) K. Overgaard.—p. 1001.

Two Cases of Rupture of Uterus (One with Patient Moribund on Admission, the Other with Recovery). J. Henrichsen.—p. 1025.

Protrusion of Acetabulum.—Overgaard says that the changes in the joints in Otto's disease agree with those in ordinary arthritis deformans except that in protrusion there is a forward arching of the acetabulum with a deep seat of the head of the femur and in arthritis deformans a flattening or a "wandering" of the joint surface laterally and upward. The deformity usually appears bilaterally, although the development of the two sides may differ somewhat. In the unilateral cases the contralateral acetabulum is generally deeper than normal. To the tabulation from the literature of the thirty-five cases that surely or most probably belong to this group are added nine personal cases, bringing the total up to forty-four or, with the addition of the six possible cases from the literature and one personal possible case, to fifty-one. Of these, thirty-one (or thirty-four) were in women and thirteen (or seventeen) in men. In men the disorder usually appears in the fourth decade of life; in women, in the fifth or sixth decade. The etiology is uncertain in all cases. The disturbance appears as a rule without demonstrable connection with other pathologic conditions. The possibility that a congenital skeletal variation plays a part in the development cannot be rejected, but the disorder cannot be regarded as merely an anatomic variation, since it occurs only in exceptional cases in younger persons. In three cases from the literature and in one personal case the disease appeared in young women, in three about the time of puberty. Because of signs of weakness in the bones, possibly due to endocrine disturbances or late rachitis and absence of arthritic changes, these cases are thought to be of other nature than Otto's disease; later development of an arthritis deformans might give rise to a picture resembling Otto's disease. This osteo-asthenic juvenile protrusion occurring predominatingly or exclusively in young women presents an obstacle in delivery. In the differential diagnosis between a primary osteo-arthritic protrusion (Otto's disease) and a secondary protrusion due to traumatic injury, double protrusion, possibly unilateral protrusion but with a deep acetabulum on the other side, marked arthritic processes with considerable sclerosis and appearance at a more advanced age point to Otto's disease. Certain trauma, more irregular protrusion and unilateral appearance, with the other acetabulum natural, not particularly deep, point to secondary traumatic protrusion. In infectious secondary protrusion the history and the clinical observations most often differ strongly from the picture in Otto's disease.

78: 1029-1056 (Oct. 1) 1935

Investigations on Elimination of Vitamin C. A. Guldager and J. E. Poulsen.—p. 1029.

*Some Cases of Lead Poisoning. G. Lind.—p. 1043.

Ambulant Treatment of Adiposity. C. C. Stochholm-Borresen and E. Worsaae.—p. 1049.

Lead Poisoning.—Lind reports two cases of acute intoxication after intake of fourteen teaspoonfuls of lead oxide during the course of six weeks and of one teaspoonful, respectively, and four cases of occupational lead poisoning after exposure to the effect of lead for six months, four months and five months, respectively. He says that the first two cases, in each of which the characteristic changes in the red blood picture were marked, illustrate the difference in tolerance of lead, the patient who had taken only one teaspoonful being more gravely affected. In one of the five cases with lead colic there was colic-like pain; in the other four the abdominal pain was constant. The lead line appeared in five; the sixth patient was toothless. The author emphasizes that anemia in occupational lead poisoning is a constant and early symptom. A slight increase in the number of reticulocytes and the appearance of basophil punctate erythrocytes in abnormal number go hand in hand in lead poisoning, being regeneration symptoms. The number of reticulocytes and basophil punctate erythrocytes is on the whole proportional to the degree of anemia. The effects of the blood poisoning have not been overcome until the anemia disappears, the reticulocytes return to normal and the basophil punctate erythrocytes disappear or decrease; resumption of dangerous occupations with lead should not be permissible until this time. Examination of the white blood picture showed no characteristic changes. Lind says that his sixth case of anemia, without signs of active blood regeneration, is one of the rare exceptions to the rule.

78: 1057-1068 (Oct. 8) 1935

*Hyperazotemia in Massive Intra-Intestinal Hemorrhage. T. Christiansen.—p. 1057.

*Hyperazotemia in Acute Gastric Hemorrhage. J. Clausen.—p. 1062.

Hyperazotemia in Massive Intra-Intestinal Hemorrhage.—Christiansen says that hyperazotemia occurs in grave cases of intra-intestinal hemorrhage and is a more or less marked symptom in almost all massive hemorrhages, whether due to cancer, ulcer, esophageal varices or the like. It may develop without vomiting or frequent intestinal evacuations. It may appear even if the sodium chloride elimination in the urine continues and may disappear spontaneously without salt water infusions, and it can recur repeatedly. The anemia as such is not the causal factor, because azotemia is not found in anemias in general. In intra-intestinal hemorrhages the hyperazotemia may aid in the prognosis, slight or transient rise in the blood urea indicating a good prognosis and high blood urea values, possibly with progressive rise, being an unfavorable prognostic sign, especially if the condition is complicated with symptoms of lowered turgor and achlorhydria. In such cases an attempt should be made to reduce the blood urea to normal values by the administration of physiologic solution of sodium chloride.

Hyperazotemia in Acute Gastric Hemorrhage.—Clausen states that after massive gastric hemorrhages hyperazotemia appears in the course of from six to twenty-four hours and on cessation of the bleeding disappears in a few days. His studies indicate that the main cause of hyperazotemia lies in increased urea production by the organism (resorption of blood) in combination with an impaired renal function due to the effect on the general condition; no impairment of the renal function on an organic basis can be established. That a toxic effect on the organism may contribute to increased production of urea cannot be excluded. Bacterial decomposition of the blood in the intestinal canal seems not to play a noteworthy part. Increase in the urea is believed not to depend on demineralization of the organism. Three cases are cited.

78: 1069-1096 (Oct. 15) 1935

*Investigations on Azotemia After Hematemesis and Melena. G. Alsted.—p. 1069.

Viscerocutaneous and Cutovisceral Reflexes in Abdomen. H. I. Bing and E. S. Tobiassen.—p. 1076.

Investigations on Fingerprint as Constitutional Mark in Mental Diseases: C'td. N. B. Møller.—p. 1085.

Azotemia After Hematemesis and Melena.—Alsted reports eighteen cases in which treatment was carried out from March to June 1935; an abundant diet (Meulengracht) was used in fifteen and an ulcer diet in three. In fifteen cases the bleeding was caused by gastric or duodenal ulcers and in one by an esophageal varix, and in two esophageal varices were suspected. The blood urea values were abnormally high: in nine cases more than 50 mg. per hundred cubic centimeters and in five between 40 and 50 mg. In fifteen cases an average increase of urea in the blood to 52 mg. per hundred cubic centimeters was found the day after confirmation of the hemorrhage. This azotemia diminished noticeably during the following days, was then maintained for three or four weeks, and finally fell to the average normal value of 28 mg. per hundred cubic centimeters (the McKays). No relation was seen between the azotemia and the degree of anemia, and the azotemia seemed to be independent of the different methods of treatment. The author is inclined to believe that even in the milder forms of hematemesis and melena some relation exists between the renal function and the degree of azotemia. The fall in blood pressure during every hemorrhage from ulcer causes impairment of the renal function for a shorter or longer time and is thus a contributing cause for the azotemia. Other conditions also, particularly dehydration, are believed to play a part in the genesis of the azotemia.

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